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AGRICULTURE, SHIKAR & TRAVEL.

EDITED BY

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THE

INDIAN FORESTER.

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The Date Sugar Industry of Bengal.

Unlike most other palms, the date palm *(Phœnix sylvestris)* has a very wide distribution, being indigenous in many parts of India. It forms extensive forests in Rohilkhand, on the low ground along the Ramganga, on the Mysore plateau between Shimoga and Tumkur, in the forest lands of the Gwalior State, on the outskirts of villages in most parts of the Central Provinces, and is not uncommon along the outer Himalaya, extending westward up to Jammu, and attaining an altitude of 5,000 ft. in Kumaon. It also occurs plentifully, self sown and uncared for, along the Eastern Coast, where it is occasionally tapped by a certain class of people, chiefly for toddy. But it is in Central Bengal that is it most extensively cultivated, and its usefulness as a sugar-yielding tree fully utilized. It is with a hope of attracting to it, some of the attention which it so well deserves, that I write this article, giving as much of the details of the working as the limits of a paper in the *Indian Forester* will permit.

The manufacture of sugar from the sap of this palm is a highly lucrative industry in Central Bengal comprising the districts of Jessore, Khulna, Faridpur, Backerganj, with portions of Pabna, Nuddea, and the 24 Pargánas; and it is not wholly unknown in the districts of Hugli and Howrah, and also in Northern and Eastern Bengal. The total area under its cultivation may be estimated at 150 square miles, that in the Jessore District alone being about 30 square miles (Hunter's Imperial Gazetteer, Vol. VII. page 187.)

Cultivation.—Although of an eminently accommodating nature, the date palm affects humid alluvial soils, and a moist climate. It is extremely sensitive to shade, and avoids clay soils and water logging. It is cultivated in the following manner in Bengal.

The ripe seeds, collected in May, are sown in a nursery during the rains. The nursery is kept clear of grass and weeds and in the third rainy season the seedlings are transplanted 9′×9′ into

the garden which has been previously hoed up or ploughed. This gives about 200 trees per Bengal beegha, or 585 trees to the acre. When 5 years old, the green upper leaves are tied up like a bouquet, the lower yellow coloured ones being cut away with a sharp knife. At the seventh year, the woody stem appears about a foot and half above the ground, when the tree becomes fit to be tapped. But for the health and long life of the tree it is advisable to wait until the eighth or nineth year when the stem rises about 3 feet above ground, the cutting away of old leaves being meanwhile repeated every year, and the garden kept well ploughed throughout.

The ground need not be exclusively left to the date trees. While they are young, several pulses (*Phaseolus radiatus, Cajanus indicus, &c.*) are raised under them, and when they become about 30 years old, the crowns being then elevated and much contracted, even paddy can be grown under them.

Tapping Operation.—The usual apparatus required for this work consists of (1) a rope (Fig. 3 a) 9 ft. long and 1 inche to 1½ ins. through, which is tied loosely round the operator and the tree, and by means of which a practised man can climb up the tree almost as fast as he can walk on the ground; (2) a bag or cylindrical pouch (Fig. 1 a) transversely oval, about a foot deep and 6″ × 4″ at the mouth, made of hide or plaited palmyra-leaf in which are carried the *daws*, spouts and other articles and to which are attached a wooden-hook (Fig 1 b) and two loops of string (Fig 1 c) the loops going round the waist of the man and being tied in a knot in the front, and the hook suspending an earthern pot (Fig. 1 d); (3) a piece of leather (Fig. 3 b) 1½′ × 1′ which is tied on the back of the man along with the pouch, and which protects his person from the rubbing action of the climbing rope;—and (4) three *daws* (billhooks) one heavy and two lighter ones, all being shaped like fig. 2.

The tapping is a delicate operation commenced in October and done in several stages. First of all with the heavy *daws*, all the old leaves are cut off from below the crown, and all the leaves from one side of it leaving only a few at the top, the bases of the petioles and the sheaths being carefully removed. (Fig. 3) Then with the lighter *daws* the outer zone of loose soft tissue is pared off in long slices, leaving only a thin covering of it over the sap—supplying inner zone, which corresponds to the woody zone in the older wood of all palms. Very great care should be taken not to expose this inner tissue at this stage, otherwise the tree is sure to rot and die, as often happens when the operation is entrusted to inexperienced hands. The experts at this work are called *Siulis* or *Gachis*.

After the first operation, the trees are given about eight days' rest, by which time the fine covering of soft tissue gets a little hardened and begins to crack. The second operation consists in removing this covering, great care being taken not to cut

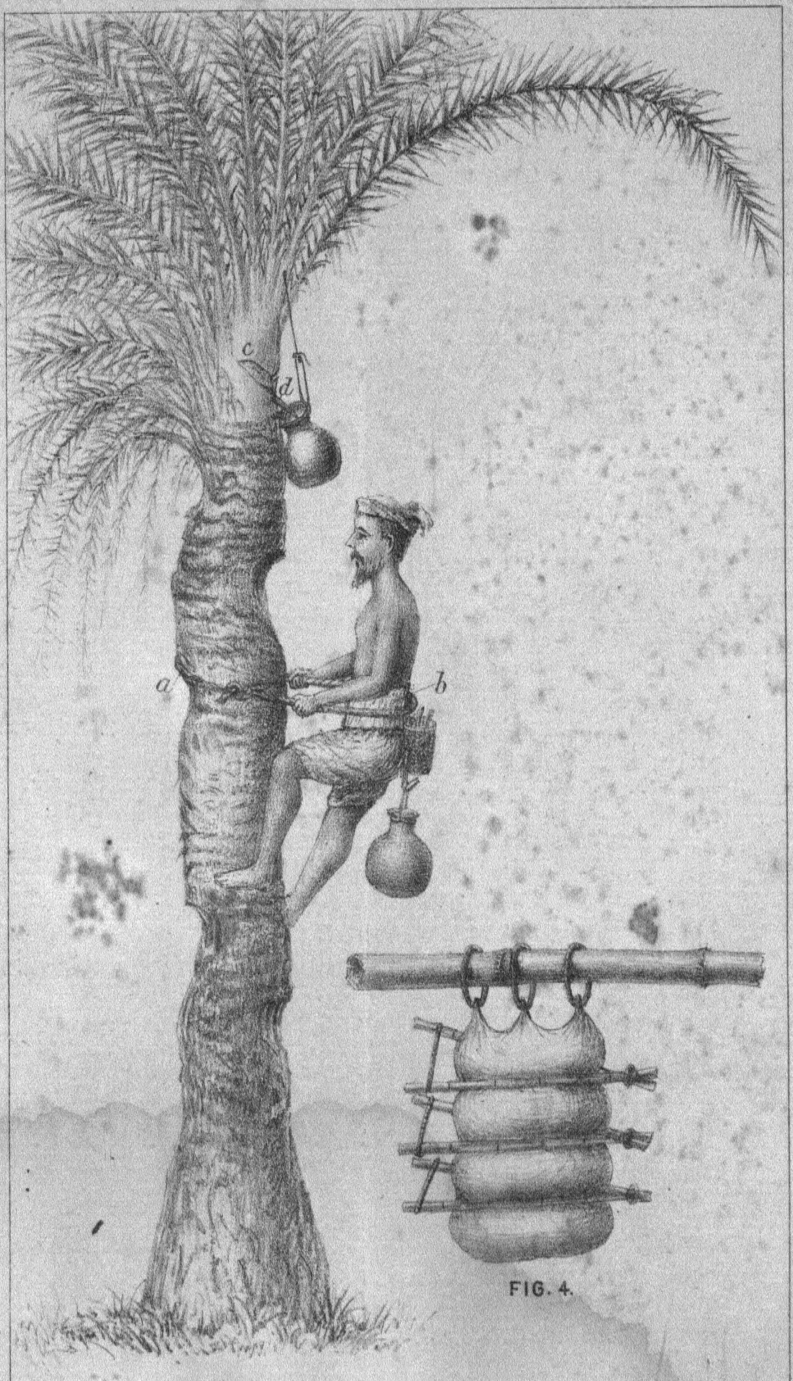


FIG. 3.

FIG. 4.

into the inner zone, which is now for the first time simply exposed. While at this, the Siuli may cut a few more of the upper leaves, leaving however a convenient one over the centre of the blaze, from the petiole of which the pot will afterwards be suspended.

Then comes a rest of twelve days or two weeks which brings us to the beginning of November. The Siuli then begins what he calls *nolen-rom* (*i. e.* fixing the spout). At the outset he divides his trees into 7 convenient groups, each group consisting of 50 to 60 trees, the number which can be operated upon in one day,—300 to 400 being the total number which one man can manage, constituting what is called a *mahál*. A large farmer may have several *maháls* each under a Siuli. The *nolen-rom* consists in cutting two eye-shaped notches 3 to 4 inches long and about a quarter of an inch deep at the base, their lower sides being straight and converging to a point (See Fig. 3 c.) below which a split bamboo switch (Fig. 3 d.) by way of a spout is gently thrust in, making an angle of about 45 degrees with the tree. If the tree is a healthy one, the sap should now be seen moistening the cuts, and trickling down the spout. The Siuli then suspends the pot which he carries from one of the upper leaves, the spout coming into it, and its mouth resting against the tree. The pots are emptied early next morning. Sometimes, to make the pot more steady, the Siuli catches hold of a leaf from the opposite side of the tree, splits it at the end, pulls the two ends on to the neck of the pot from right and left, and ties them together in a knot there. If he wants to prevent birds from perching on the pot, which some of them, allured by the sap, are very fond of doing, he cuts the end of a leaf and inserts it into the mouth of the pot, covering spout and all. If a tree is low enough to be within reach of jackals, a similar precaution is taken; but instead of the ends, the lower portions of leaves are used, the strong spinescent leaflets effectually keeping them off. In the case of weakly trees which do not give out much sap at the first cutting, the pot is not put up until the week after. The first two or three week's sap is very valuable, for the *gúr* produced from it, called *nolen-gúr*, has a pleasant smell and is much appreciated by the consumers.

After a week, the cut is renewed a little, the froth and dirt accumulated on the first cut carefully removed, and the pot again hung up. In some parts the cut is made on three consecutive days. This gives a much greater quantity of sap, but the trees become weakened, and the quality of the *gúr* is much inferior, being mostly uncrystallizable molasses. In this case, the rest given is not a week but only four days. Each day's sap has a name given to it, being respectively *Jiren* (rest), *Dokát* (second cut), and *Te-kát* (third cut). They are never mixed together but boiled into *gúr* separately, the *Te-kát* producing hardly anything but molasses. Under the one-week system, the pot may be put

up, without renewing the cut; to collect what is called *ola* (trickling) This is boiled separately into molasses. The sap collected during the day time under the other system is also called *ola*. In any case, the cut is renewed week after week until about the middle of March, by which time a very deep notch is made into the tree nearly reaching its centre. The next year's cut is made on the opposite side of the tree but at a higher level, the tree having grown in height in the meantime. This, continued year after year, gives the tree its characteristic zigzag appearance.

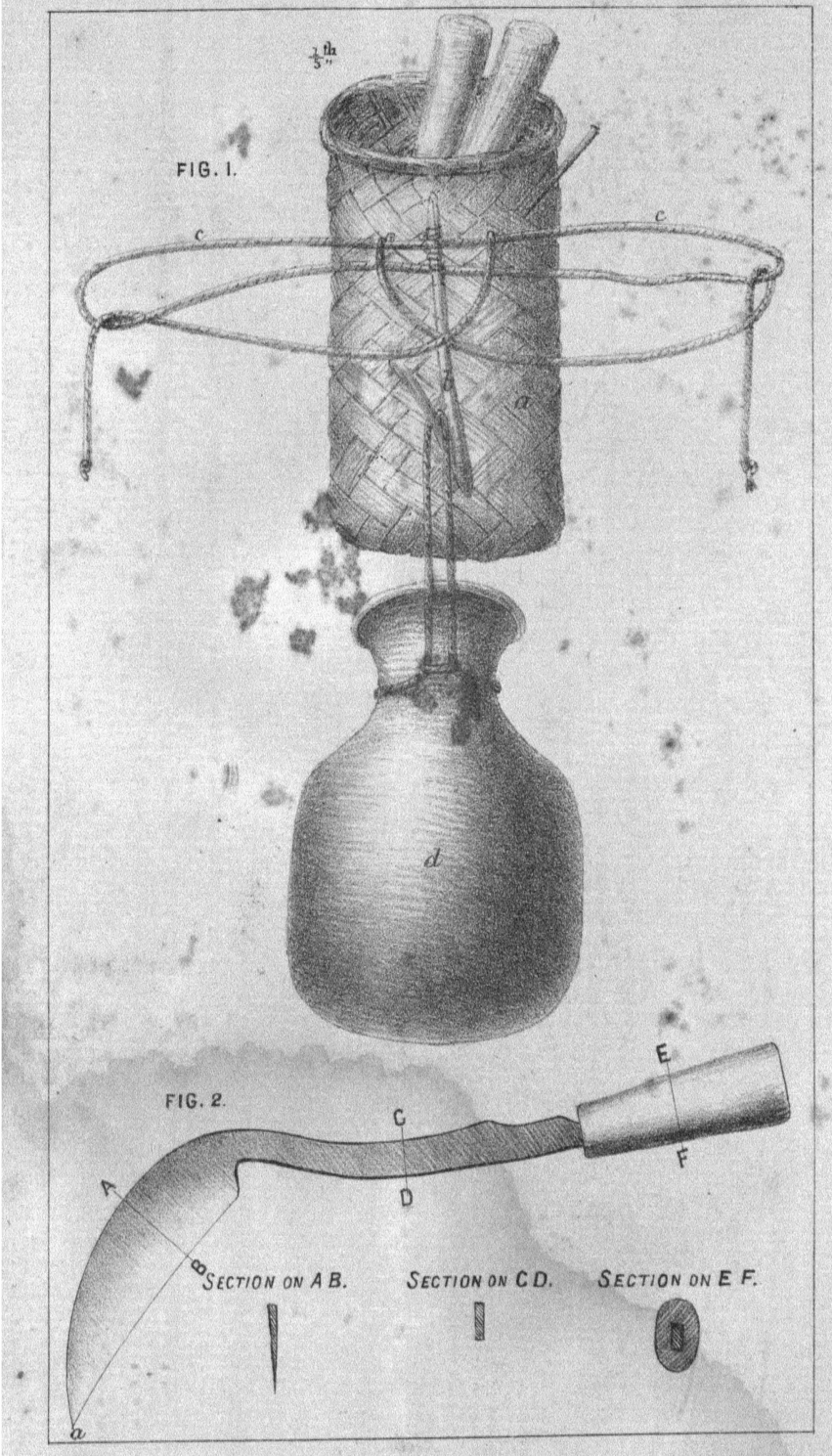
The yield of sap is greatest in mid-winter. The sap collected in calm and cloudless nights gives *gúr* of the best quality. In January, when the trees begin to put forth their inflorescence, the sap becomes very poor in sugar, though profuse in quantity, and as a rule does not produce good crystals. The average yield of a tree is about 10 seers a day. It becomes less and less after the trees are about 20 years old, but the sap becomes almost proportionately richer in saccharine matter.

The earthen pots in which the sap is collected require some care. They have to be well smoked every morning as soon as emptied. This gives them a glazed surface; also the alkaline salts of the smoke neutralize acidity, and the heat kills any ferments that may have been produced. If this were neglected, the ferments would eat up all saccharine matter, and the sap would become a toddy.

The *daws* also require to be closely looked to. They are sharpened several times a day on a batten of dry wood—preferably of Kúl (*Zizyphus Jujuba*)—sprinkled over with fine sand while the *daws* are new, but with dry potter's clay afterwards. They may even require tempering once or twice during the season. Special care is given to the tip (Fig 2 a).: if too sharp and pointed it cuts into the tree and thus injures it, sometimes fatally; and if too blunt, it tears the tissues and clogs the pores at the base of the cut, with the serious result of turning the sap acid and frothy.

Boiling.—For this purpose a peculiar sort of furnace is made; a shallow rectangular pit is dug in the ground, over which a low dome of mud is built, supported on a framework of bamboo while the mud is soft. Into this dome, circular holes 15 to 18 inches in diameter are cut in two rows along the length of the rectangle, the number varying according to requirements, from 4 to 14; and two flues are made at the short ends. On each of the circular holes is placed a conical (more properly semi-elliptical) thimble-shaped Earthen vessel capable of containing from 30 to 60 lbs of sap. Usually an umbrageous tree is utilized for its grateful shade; in default of it a temporary shed of date leaves supported on bamboo posts is erected over the furnace.

The fuel supply is a point of some interest. Towards the Sunderbands, Sundri wood *(Heritiera littoralis)* is generally used, but elsewhere the cost would be prohibitive. Dried up date


1/5th
FIG. 1.
c
c
a
d
FIG. 2.
E
C
F
A
D
B
a
SECTION ON A B.
SECTION ON C D.
SECTION ON E F.

leaves, those which, as mentioned above, are cut in October, are utilized as far as they go, but they do not go very far. A few farmers living along the Railway lines have of late years (since the opening of the Jubilee Bridge at Hugli) begun to import coal from Raniganj, but this is not possible for people living in the interior. The main supply then comes from the village coppices. This sounds strange, but certain areas in every village in Lower Bengal, mostly around homesteads and under mango and other trees, are perpetually treated as coppice on one year's rotation, without anybody even so much as dreaming of the sylvicultural system which they practise. The species so treated are Ghentu (*Clerodendron infortunatum*), Ans-Seoru (*Glycosmis pentaphylla*), Bákas (*Adhatoda vasica*), Se-kúl (*Zizyphus Œnoplia*), and such other shrubs. The *gur* manufacturers get these for a mere song, as the proprietors are only too glad to have their jungle cleared free of cost every year.

The boiling once started continues day after day, the Siuli operating on a fresh group of trees every day. As soon as the furnace is well ablaze, a thick white froth appears on the surface which should be promptly removed. For this purpose a ladle, called *Urki*, made of a cocoa-nut shell with a bamboo-stick as handle, is used. The date palm sap, however, is remarkably free from feculent matter and therefore requires less skimming than the cane or any other kind of sugar-yielding saps. It has, on the other hand, a slightly larger proportion of gluten, and therefore gives a smaller outturn of sugar crystals. After about an hour's boiling, the sap is said to be *Sarisa-phuli* (like mustard flower) from the fact of its turning golden yellow and giving out in quick succession small round bubbles which resemble the petals of the mustard flower. Soon after this, big isolated bubbles rise slowly with a dull explosive noise, and the peculiar smell of *gúr* is noticed. The *gúr* is now ready, and must be promptly poured into earthen jars or other vessels in which it will be taken to market for sale. If too little done, the *gúr* is liable to become acid after a few months, and the crystals small; if too much done, it suffers in colour and flavour and may even become bitter and sticky, and therefore uncrystallizable. It is therefore very important that the boiling be stopped at the right time. The crystals form when the *gúr* cools. The outturn of *gúr* is from 1-10th to 1-8th of the quantity of sap. It is estimated that an average tree yields about half a maund (41 lbs.) of *gúr* per year.

The next point is sugar-making. I will notice this but briefly. As a rule the cultivator himself does not do it on a large scale. He sells his *gúr* to the sugar manufacturer who is usually a well to do sweetmeat-maker. The *gúr* is put into gunny bags, which are then hung up on poles, and pressed tight, each by means of three pairs of bamboo levers, as shewn in Fig 4. The molasses trickles down leaving the brown crystals in the bags. The raw sugar is then thrown either into baskets or into

earthern tubs, called *nánds*, with perforations underneath. It is then lightly sprinkled over with water, and covered by a layer of *pata (Vallisneria spiralis,)* two inches thick. This is an aquatic plant found growing luxuriantly at the bottom of stagnant pools of water, such as *beels* and old tanks ; and even of rivers with little or no current, of which there are so many in Bengal (*e. g.* the Kapatuk, the Chitra, the Betna, the Bhairab, the Kana-Nadi, the Kana-Damodar and others). The attenuated cellular tissue of this plant has the property of absorbing moisture at every point to a remarkable extent, and the result is that after a week, the brown crystals to a depth of about 2 inches become tolerably white and glistening. This upper layer is then removed and sun-dried, and the process repeated with the remainder. The molasses collected in this manufacture is boiled down in large pans into a black sticky treacle which is an indispensable ingredient in the tobacco for the native hookah and has therefore an extensive sale all over India. The date palm treacle supplies at any rate the whole of Bengal.

I give below an estimate of the probable expenditure on and income from an acre of this kind of plantation.

EXPENDITURE.

Preparing nursery, sowing, and transplanting one acre of garden, once for all					Rs.	12	0	0
For the first eight years annually, Interest on Rs. 12 @ 25 per cent per annum (the usual rate of village moneylenders in Bengal	Rs.	3	0	0				
Rent (for half year, that for the other half being debitable to pulses, &c.) ...	,,	4	0	0				
Ploughing twice a year	,,	1	0	0				
Weeding and cutting leaves	,,	1	0	0				
						9	0	0
This repeated every year and with compound interest @ 25 per cent will after the 8th year amount Rs. 179 say					Rs.	180	0	0
After the first eight years, annually.—								
Interest on Rs. 180, @ 25 per cent ...					Rs.	45	0	0
1½ Siulis @ Rs. 5, for 5½ months ...					,,	41	0	0
1 Assistant @ Rs. 3, do.					,,	17	0	0
Pots, vessels, &c.					,,	27	0	0
Daws and gear					,,	10	0	0
Fuel					,,	50	0	0
Carting the *gúr* to market					,,	10	0	0
Contingencies					,,	15	0	0
				Total	Rs.	215	0	0

INCOME.

Number of trees tapped daily $= \frac{585}{7} = 83$

Quantity of sap collected daily @ 10 seers a tree = 830 seers.
Outturn in *gúr* (1 10th the quantity of sap) ... = 85 ,, or say 2 Mds.
Total quantity of *gur* for the whole season of 135 days (from 1st November to 15th March $= 135 \times 2$ = 270 Mds.

The selling rate is from Rs. 2-8 to 3-8 per Md.
Taking the lowest rate we get ... Rs. 675

Deducting the total Annual Expenditure of Rs. 215 we get a net profit of Rs. 460 per annum per acre.

The average sap-yielding life of a tree may be taken as 20 years, after which period the trees, if sold even as fuel, will fetch at least the capital outlay of Rs. 188.

It will be seen from the above figures that a poor family of the cultivator class, who contrive to live on an annual income of Rs. 60 or so, can live comfortably on the proceeds of a hundred trees, if they are only taught how to go about the business ; for the net profit per tree per annum may very safely be put down at a rupee and this may undoubtedly be exceeded in the vicinity of forests where fuel is plentiful and cheap, and if indigenous trees are utilized.

I think it will be interesting to know if the Agricultural Department has up to date made any attempt to introduce this industry where it is yet unknown, and the result of such attempt. Forest Officers, especially those in charge of forests where this useful tree is indigenous, will no doubt take great interest in such information, and will, with the greatest pleasure, co-operate with the sister department as far as lies in their power.

UPENDRANATH KANJILAL.

COMPARISON BETWEEN THE

Floras of the Eastern and Western peninsulas of India.

BY SIR D. BRANDIS (TRANSLATED BY C. G. R.)

Sir D. Brandis communicated a paper in which he discussed the principal differences between the flora of India proper and that of further India. Both peninsulas enjoy a similar rainfall and the same conditions as regards the amount of moisture in the air. They differ however in some essential matters. The flora of the peninsula of India proper, agrees most closely with that of tropical Africa, while that of further India approaches that of the Malay Archipelago. That several genera which are represented by a considerable number of species in Africa, exist in India proper, and have nearly or entirely disappeared from further India, proves the correctness of this statement. As an example, we may mention the genus *Cleome*, natural order *Capparidaceæ*. 22 species of this genus are found in tropical Africa, 12 in India proper, while only one, *Cleome viscosa*, a common widespread tropical weed, is found in further India. *Maerua*, which in Africa is typically a limited genus with 17 species, has in India proper only 2 species, *Niebuhria (Maerua) linearis* and *Maerua arenaria*, and is not found in further India.

Cadaba has 6 species in tropical Africa, four in India proper, and none in further India. Among the *Meliaceae*, 6 species of the

genus *Turrea* are known in Africa, 2 in India. *Cochlospermum Gossypium*, a small tree with large golden flowers, of the natural order *Bixaceae*, which is characteristic of the dry areas in India proper, is not found in further India, but 3 species of this genus are indigenous in tropical Africa.

A second essential difference exists in the configuration of the land. In both peninsulas, mountains rise to a height of 7,800 feet. The mountains of India proper are separated from the Himalayan Mountain Range by the vast plains watered by the Indus and Ganges and their tributaries. In further India, on the contrary, the large rivers of the Irrawaddy, Salween and their tributaries flow essentially from North to South, the mountains which separate the valleys, in which these rivers flow, from each other, and from the Bay of Bengal, stretch in the same direction, joining the Eastern ranges of mountains as far as China, with the continuation of the Himalaya, to which they themselves are united at their Northern ends.

The fact that several genera and species which are found in the Himalaya, and in the mountains of China, are represented in further India, and are absent from India proper, is traceable to this arrangement of the mountain Ranges.

It may be advisable to illustrate this statement by reference to the genera *Acer*, *Æsculus*, the natural order *Cupuliferæ* and the genus *Pinus*. The genus *Acer* contains, even when one accepts a mean of the recorded number of species, 60 or 70 separate individuals, and of these 39 species grow in the Eastern parts of Asia, *i. e.* in the Himalaya, and Japan. These regions form the centre of its distribution and in them the greatest variety of forms is exhibited. If we exclude the states bordering on the Mediterranean Sea, the Maple is not found in Africa, and it is also absent from the whole of the peninsula of India proper, although one or two species thrive well in the gardens of the Nilgiris. Of the 14 East Indian species, 12 belong to the Himalayan Range of mountains ; while 2 only are found in Burma (*A. isolobum*, (Kurz) and *A. niveum*, (Blume) the last named being also indigenous in Sumatra. *Acer oblongum*, (Wall,) and *lævigatum*, (Wall,) extend far South into Burmah, the former down to the tropics, the latter to the 16th degree North Lat.

Eleven species of the genus *Æsculus* are known, of these 6 belong to the new, and 5 to the old world. Of the latter *Æ Hippocastanum* is indigenous to the Mountains of Greece, *Æ indica* to the North West Himalaya, while *Æsculus Punduana* extends from the Eastern Himalaya through the peninsula of further India to Siam. Two species, *Æsculus chinensis* and *turbinata* have their home in China and Japan. In the hills of the peninsula of India proper and also in Africa the genus is unknown.

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(1) Dr. Pax (Engler, Jahrb. VII p. 177 XI p. 72) records 85 species.

The natural order of the *Cupuliferæ* is very markedly developed in the Himalaya, China and Japan, and all the Indian genera *Betula, Alnus, Quercus* (in its widest meaning), *Castanopsis* and *Carpinus* are represented in further India, the oaks numerously so. In India proper, however, and in Africa, excluding the provinces bordering on the Mediterranean Sea, this Natural Order is not found.

Five species of the genus *Pinus* are known in the East Indies. *P. excelsa* and *Gerardiana* belong to the North West Himalaya ; *Pinus longifolia* grows on the spurs and in the valleys of the outer ranges of the Himalaya from Afghanistan to Bhootan ; *Pinus Kasya* forms a pure forest on all the high hills of further India, above 2,600 ft. ; and *Pinus Merkusii* is found in conjunction with *Dipterocarpus* in the Thoungyeen and other localities in further India about the 16th degree N. L ; it is also found in Sumatra and Java. In India proper and in Africa except near the Mediterranean Sea, the genus *Pinus* is absent. Besides the above mentioned genera, there are still several which are found in the Himalaya and further India, which are not found in India proper or Africa. Among these a few genera indigenous to the Himalaya are found in the mountains of tropical Africa, which are absent both from India proper and from further India ; of these the genus *Juniperus* is worthy of notice.

Juniperus procera grows on the mountains of Abyssinia and is found on those of Kilimandjaro in tropical Africa. Four species of *Juniperus* are indigenous in the Himalaya. An intelligible distribution is not wanting in the genera which are found in India proper and further India and which are absent in Africa except in the Provinces bordering on the Mediterranean Sea. Take, for example, *Euonymus* : of the 27 Indian species, 6 are found in India proper, 3 in Ceylon, 11 in the Himalaya and 7 in further India. As another example : Teak, (*Tectona grandis*), forms a great portion of the forests in both peninsulas while in the dry portions of further India, a second species, *Tectona Hamiltoniana*, is found. The genus *Tectona* is not found in Africa.

In conclusion, it must be mentioned that the saying " nulla regula sine exceptione " holds good. There are some tropical species which are found in further India and Africa and are wanting in India proper. We may mention two genera of trees and shrubs belonging to the family *Connaraceæ* as a proof of this. Three species of the genus *Agelæa* are found in tropical Africa, 2 in further India, and 4 other species in Madagascar. *Cnestis* has 7 species in tropical Africa, and one (*C. ramiflora*) grows in further India, Sumatra and the Philippine Islands.

C. G. R.

The Forest Service of Netherlands India.

We have been favoured with an account of the classes and grades of the Forest Service in Java and Madura, by the kindness of one of the Conservators.

It is a little difficult to translate florins into rupees, but we have thought it best to go by the silver value. As the rupee contains, ·372 oz. Troy and the florin ·328 oz., we may say that the florin is nearly equivalent to ·88 rupee. Taking this rate, the classification and rates of pay are as follows:—

Upper Service.—for which the diploma of a European Forest School is required:

	Pay about.	*Travg. All. about.* per day.
Inspector General of Forests	Rs. 1,050 to 1,500	Rs. 8 12
Houtvester (Conservator) 1st class	„ 660 to 1,000	„ 7 4
„ „ 2nd „	„ 400 to 700	„ 7 4
„ „ 3rd „	„ 300 to 460	„ 5 4
Aspirant Houtvester (Dy. Consr.)	„ 220 to 400	„ 5 4
Technisch ambtenaar (Asst. Cons.)	„ 130 to 300	„ 5 4

Lower Service.—for which the diploma of any Indian School is required.

Bosch-opriener 1st class	Rs. 132 to 176	Rs. 44 fixed all.
„ 2nd „	„ 88 to 132	„
„ 3rd „	„ 110 to 154	„
Tijdelijk opriener	„ 66 to 110	„

Native Service.

Mantrie-politie } (Forest	Rs. 44	none.
Boschwachter } Guards)	„ 13-4	

Visit of Spainsh Foresters to the French 'reboisement' Works.

All the nations of Europe follow with a marked interest the progress of the huge work which France has undertaken with a view to the restoration of mountain lands. For some ten years, studies relative to this subject have been made in the French Alps by deputations which have been sent from Austria, Russia England, Switzerland, Italy, and now Spain. Visitors follow each other in rapid succession, work with ardour and all depart satisfied and pleased with what they have seen.

Recently, the Spanish Government wished to complete the training of its young Foresters by a practical exercise bearing on the correction of torrents. The field of their explorations was chosen in France in the Basses-Alpes. The deputation which has just visited France consisted of Don Miquel del Campo, Ingeniéro de montes, professor of sylviculture at the College of the Escurial, and of seven students of that college who in a few weeks are to pass out into the active service. The deputation arrived on the evening of the 15th July at Barcelonnette, where M. Demontzey, Forest Administrator, was at the time on tour. That high functionary, assisted by M. Carrière, Conservator of Forests at Aix, and all the local Forest Officers, directed the studies of the deputation on the ground.

Four days were given to excursions in the area under restoration in the Ubaye valley. In this area were visited, on the 16th, the torrents of the Bourget and Faucon; on the 17th, the torrents of Gaudrisart and Riou-Chanal; on the 18th, the torrent of Riou Bourdoux; on the 19th, the torrents of the Bourget and the Sanières.

On the 20th, the deputation left Barcelonnette for Spain.—*(From the Révue des Eaux et Forêts).*

II.—CORRESPONDENCE.

Fires caused by Bamboo Friction (No 1.)

In reply to S. E. W. on Fires caused by Bamboo Friction, I write to say that I have seen the Koyas of the Bhadrachellam Taluk, Godavari District, light a fire by rubbing two pieces of dry bamboo together. But the bamboo was not *in the round*; before the man could produce the fire he had to *prepare* the bamboo, and the following sketches clearly show how the thing is done.

A bamboo is slit in two, in one piece a slit (A. B. in Fig I) is made about 1-3rd of an inch wide and with the sharp edge of the second piece a man rubs over the slit A. B. as hard as he can. (Fig. II.) A fine wood powder is produced which in a very short time ignites.

FIG. I.

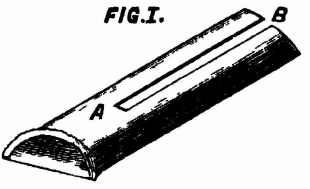
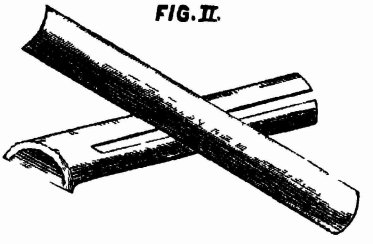


FIG. II.



The edges of the slit and of the piece used to rub with must be sharp, and both pieces of bamboo must be firmly held. That fires can be produced by the rubbing of two pieces of bamboo *in the round* I consider an impossibility, and so did that Koya before we parted.

J. S. B.

FIRES CAUSED BY BAMBOO FRICTION (No. 2.)

The Honorary Editor, in the October issue of the 'Forester,' appends a foot note to the article under the above heading asking for any authentic instance of fire caused by friction of bamboos.

I have now and again seen fire obtained by Burmans, Karens and Shans in this manner, but I cannot possibly do better than extract bodily from Mason's 'Burma' Vol. II. what he says on the subject.

"Among other uses to which the bamboo is applied in 'Burma, not the least useful is that of producing fire by friction. 'For this purpose a joint of thoroughly dry bamboo is selected, '1½" or 2" in diameter, and this joint is then split in halves. A 'ball is now prepared by scraping off shavings from a perfectly 'dry bamboo, and this ball being placed on some firm support, as a 'fallen log or piece of rock, one af the above halves is held by its 'ends firmly down on it, so that the ball of soft fibre is pressed 'with some force against its inner or concave surface. Another

'man now takes a piece 1″ long or less, and shaped with a blunt 'edge something like a paper knife and commences a sawing 'motion backwards and forwards across the horizontal piece 'of bamboo, and just over the spot where the ball of soft fibres is 'held. The motion is slow at first, and by degrees a groove is 'formed, which soon deepens, as the motion increases in quickness. 'Soon smoke arises, and the motion is now made as rapid as possi-'ble, and by the time the bamboo is cut through, not only smoke, 'but sparks are seen which soon ignite the materials of which 'the ball beneath is composed. The first tender spark is now 'carefully blown, and when well alight the ball is withdrawn, 'and leaves and other inflammable materials heaped over it, and 'a fire secured.

In the appendix to the same work the following also occurs :—

"Another method of obtaining fire from bamboos is thus des-'cribed by Capt. T. H. Lewin as practised in the Chittagong 'Hills. The Tipperahs make use of an ingenious device to obtain 'fire, they take a piece of dry bamboo, about a foot long, split in 'half and on its outer round surface cut a nick or notch, about ½″ 'broad, circling round the semi-circumference of the bamboo, 'shallow towards the edges, but deepening in the centre until a 'minute slit of about a line in breadth pierces the inner surface 'of the bamboo fire stick. Then a flexible strip of bamboo is 'taken about 1½′ long and ⅛″ in breadth to fit the circling notch 'or groove in the fire stick. This strip or band is rubbed with 'fine dry sand and then passsed round the fire stick on which the 'operator stands, a foot on either end. Then the slip, grasped 'firmly, an end in each hand is pulled steadily back and forth, 'increasing gradually in pressure and velocity as the smoke 'comes. By the time the fire band snaps with the friction, there 'ought to appear through the slit in the fire stick some incandes-'cant dust, and this placed, smouldering as it is, in a nest of dry 'bamboo shavings, can be gently blown into a flame. "*Hill 'Tracts of Chittagong and the dwellers therein*"—*p.* 83.

I have never seen this last method practised, but, as I have said above, the former method is well known in Burma.

F. J. B.

FIRES CAUSED BY BAMBOO FRICTION (No. 3).

SIR,

In your last issue you call for authentic cases of where fire has been obtained by means of friction and as a case once came under my personal observation, I send you details as to how the fire was obtained.

During 1890 I was stationed at Htigyaing in Upper Burma and while returning home from an afternoon ride with a friend we got caught in a shower of rain and were obliged to take shelter in a Zyat (Burmese rest house) on entering which, we found two Burmans engaged in obtaining fire out of two pieces of bamboo by rubbing one against the other. One of the Burmans asked me for a match, but I would not give him one, as I wished to see him obtain the fire from the stick, and told him to continue the operation. The materials employed were two pieces of split, dry, bamboo obtained from the roof of the Zyat. One piece (A) had a small slit cut in it transversely at the top about ¼ inch deep so as to just go through it, the edge of the piece (B) being so shaped as to exactly fit this slit.

Fig. I.

Longitudinal Section of A

Fig. II.

Transverse Section of B

Fig. III

A and B in position.

One of the men then scraped both the convex and concave sides of the split piece (A) with a knife and obtained some fine shavings which he placed in the concave side of the piece (A) just under the slit. The second man now fitted the piece (B) into the incision as shewn in Fig. III and began to pass it rapidly backwards along the incision and in about five minutes obtained fire with which he lighted his cigar.

I tried the operation myself with fresh tinder and also obtained fire.

W. J. L.—R.

A Forest Blazer.

SIR,

Having been away on leave, I have only just seen the August Number of the *Forester* in which I see "Velleda" proposes a tree as a badge for the Forest Blazer. Why not take the hunting horn as our badge, the badge (a hunting horn) on the Nancy Forest Blazer is very neat and effective, besides being good heraldry, as the horn has been connected with Foresters in song and story from time immemorial.

"TAW KWAY."

III.—OFFICIAL PAPERS & INTELLIGENCE.

Note on the Potato Disease in the Poona District.

In January last year a potato disease was brought to notice affecting the crop of the Khed aud Junnar Tálukas, which largely supply the Poona and Bombay markets. It has since been found elsewhere in the Poona District, in the Gujarát, and at Mahabaleshwar. It seems to have made its first appearance some three or four years ago, and it now occupies the chief potato grounds of the Presidency, causing heavy loss to cultivators and a marked deterioration of quality in the potatoes sold for consumption.

The cultivators call this the " bángdi " disease, owing to the appearace of a dark ring, easily visible in the substance of the tuber on section. Unsound and (apparently) sound potatoes are found in the same field ; but the whole crop is, in such cases, probably affected. The first *outward* sympton is a withering of the green top, with arrests of the growth of the tuber. The diseased crop, when dug, is found to be greatly undersized throughout, many tubers are rotten and putrid ; others show, by a small livid spot, where putrescence is about to set in. The whole potatoes are eatable when fresh, but rot away in storage.

2. During the past season, potatoes were imported from Mahabaleshwar, Saharanpur, Bangalore, Ootacamund* and England, and were distributed to cultivators as seed, in the hope that the sets from hardy stocks and from a distant soil might prove sufficiently robust to resist the infection, at least for some years. Mr. Mollison, the Superintendent of Farms, gave special attention to this experiment and also tried the effect of applying solutions of sulphate of iron and of sulphate of copper to the affected fields. Both experiments have failed. The worst plots were naturally those sown with the Mahabaleshwar seed, it not having been known before that the hill district was already infected. The only sound crops found were those grown in the compound of the Mámlatdár's office at Khed and in a garden hitherto used for " páu " (*Piper betle*). Neither of these two grounds had been under potato for some years certainly. All the other crops exhibited the characteristic ring.

*The disease has made its appearance in the Neilgherries. The seed imported was of a kidney potato, which at Ootacamund had been found best to withstand infection.

3. Concurrently with these experiments, a field was sown at the Khandesh Government farm with Poona seed which appeared to be perfectly sound. Some of the seed potatoes were kept for further examination. Khandesh is not a potato district, and the land sown had never been under potato before. The crop was diseased throughout, proving that the seed was infected, though

when sown, the signs of disease were not distinguishable by the eye. On examination of the seed-potatoes which had been stored, the characteristic ring and a mottled unhealthy condition of the flesh were plainly apparent. Mr. Mollison found in the diseased crop indications of a fungus which appeared to attack the green stem first.

4. At the Poona farm, four varieties of English potatoes received from Messrs. Sutton and Sons, were planted side by side with Poona potatoes, selected for apparent soundness, on land not before used for this crop. The English seed of all varieties produced a sound and healthy crop and has been reserved as seed for further experiment The local potatoes were diseased, but not greatly so, and were marketable. In this experiment all the potatoes were planted in ridge-rows as in England; the irrigation water being directed along the furrows.

5. A small quantity of true seed (from inflorescence) was obtained from France and was also tried at this farm. The object of growing from the true seed is to establish a strong and natural stock, such as in Europe is systematically resorted to when the artificial strains have shown a tendency to weakness. This experiment is being continued, but conclusions cannot be drawn at this early stage.

6. Specimens of plants in various stages of sickness, have been submitted by Mr. Mollison to Dr. Cunningham, the Special Assistant to the Sanitary Commissioner with the Government of India, who has undertaken a scientific investigation of the blight. I have Dr. Cunningham's permission to quote his provisional conclusions, but it must be clearly understood that the subject is still under enquiry by him, as well as by this department, and that any opinions expressed are subject to modification after a more complete investigation. Dr. Cunningham writes:—

"You are quite right in distinguishing this affection from 'common potato blight; for there are no signs of phytophthera 'about the plants. So far as I can ascertain, it is essentially due 'to an invasion of the vascular bundles of the base of the haulm 'by fungal mycelium, which is to be found in all the elements of 'the bundles, and in special abundance in the larger vessels, which 'are in many places absolutely plugged by dense sclerotical masses 'of filaments. With such an invasion of the water-leading system, 'it is of course only natural that withering of the host should 'occur. The method of irrigation which you say is employed must 'afford special facilities of access to the parasite invading the sub-'merged basis of the haulms, and the continuous cultivation of 'crops from year to year in the same areas must tend to keep up a 'continuous supply of the parasite, the sclerotical masses of 'mycelium within the vessels being very well adapted to survive 'prolonged periods of dormancy with a capacity for renewed active 'growth on the recurrence of favourable conditions."

7. Mr. Mollison drew attention to the fact that the disease shows itself only on the plant approaching maturity, when the

fibro-vascular bundles of the stem are well developed. At first the flesh of the tuber shows little or no sign of disturbance, but at a point about an inch below the soil-surface, a brown stain makes its appearance in the substance of the haulm, and, this extending above and below, the disease rapidly declares itself. The sudden wilting of the apparently healthy green plant, often within 24 hours, is a marked and peculiar symptom. In a further communication, Dr. Cunningham says :—" None of the specimens ' of the blight which I have seen show any trace of spore formation ' but they do most distinctly show the formation of sclerotical ' masses of mycelium within cavities of the vessels. These are ' probably the source of propagation, as similar bodies certainly are ' in the case of some vegetable blights ; and if so, the delay in ' the appearance of the disease is readily accounted for, as ' sclerotia frequently require a considerable time to become ' roused from their dormant condition and give origin to new ' mycelium. They, in fact, play the part of resting spores, and, ' like them, are not always at once prepared to germinate. The ' brownish tinge in the vascular bundles is in the haulm clearly ' associated with the invasion of the mycelium..... It is, as ' you suggest, very probable that it is only in the upper layers of ' soil that the sclerotia find all the conditions favouring their ' becoming active. There appears to be little tendency to spread ' of the mycelium downwards along the bundles of the roots, as ' compared to that which it has to pass upwards along those of the ' haulm, and I have as yet been unable to find any traces of it in ' the tubers, even where most highly affected as indicated by the ' blackening of the vascular bundles and surrounding areas of ' parenchyma."

8. The scientific enquiry, Dr. Cunningham goes on to say, can only be concluded by means of experiments on infection of living plants, and these cannot be carried out before next cold weather. Meanwhile, every effort must be made to discover a practical remedy for a disease which threatens to destroy one of the most valuable garden crops of the country. So far it has been shown :—

(i). That the disease is not the European potato-blight. From this it differs in the absence of the black fungus spots on the leaves and of the characteristic odour ; and it differs also in not being amenable, when the crop is in the ground, to treatment by the sulphate of iron and copper solutions.

(ii). That diagnostic symptoms may be found before the characteristic ring in the tuber is apparent, in the sudden wilting of the green top, and in the antecedent brown discoloration of the fibro-vascular bundles of the haulm, discoverable on section.

(iii). That the disease-germ harbours in the soil, and will infect all stocks however robust.

9. The origin of the pest is probably to be found in exhaustion of the soil and of the stock owing to over cultivation. The crop is so profitable that it is grown year after year on the same land, and the unwillingness of the cultivator to exchange it for less valuable produce, even when disease is rife, forms one of the chief difficulties to be met. A rest from potato for three or four years would probably cleanse infected land.

10. This note is published in the hope that, attention being drawn to the subject, other investigators may assist in the enquiry, so that repressive measures may be introduced without loss of time. The further experiments to be made by this department next season will be carried out mainly on the following lines; but others will doubtless suggest themselves:—

(i). By application of the solutions of iron and copper to the field *before sowing*. Dr. Cunningham's researches have afforded a clue to the failure of this method when applied to the growing crop. Used in this way, it succeeds with the ordinary blight, and in the absence of microscopical investigation it was puzzling to find that it had absolutely no effect on this disease. But, as the fungus is found to establish itself at once in the deep tissues, it is clear that external applications to the plant can be of no use. The fungal germs can, however, be attacked while harbouring in the soil, and a free treatment with the solutions ought to succeed. If in infected soil, so treated, and sown with healthy seed, an untainted crop can be produced, a considerable step in advance will have been made.

(ii) By improved cultivation. The method adopted at the Poona Farm, of growing the potatoes on ridges as in Europe promises to afford considerable protection. There is little doubt that a saturated surface soil is favourable to the disease and this it gets in perfection by the native method of growing potatoes on the flat. Mr. Mollison placed his ridges about 24 inches apart, with a foot between sets, and, the irrigation water being run in the furrows, the soil was kept continuously moist without ever being in the condition of a quagmire as under the native system of flooding. The potatoes so grown were of fine quality and flavour and free from the waxiness common to the Indian grown tuber. This, and the fact that none of the Indian potatoes produce seed-plums, looks as if a faulty method of cultivation may have caused degeneration and consequent susceptibility to disease in all the acclimatized stocks. The ridge system, in any case, deserves to be fully tried.

11. I append a few instructions as to the solutions referred to in the preceding paragraph.

E. L. CAPPEL,

Director, Land Records and Agriculture,

Poona, 11th June, 1892. Bombay.

Cooper Sulphate solution with quicklime ("Bouillie Bordelaise") for 1 acre:—

46 lbs. sulphate of copper.
22½ lbs. quicklime.
220 gallons of water (2,200 lbs.)

The sulphate should be dissolved by hanging it in a coarse cloth or basket in water contained in a wooden vessel. Hot water acts more quickly. The quicklime is slaked in a separate tank and then stirred into a fine gruel with added water. This should be passed through a sieve into the solution, well stirred, and the remaining water added.

Iron solution with quicklime is made in the same proportions, substituting the iron for the copper salt. It is much cheaper, but its value has not been definitely proved. The "Bouillie Bordelaise" was proved to be specific for the European blight by an exhaustive series of experiments in England and on the Continent, and the recipe is given as published by the Royal Agricultural Society. As the quantities were intended for spray application to the plant surface, probably more will be required for the disinfection of the soil, and a double quantity of the copper solution might be tried; in the case of the iron solution even more may probably be applied without danger to the crop.

Pass-Marks at the Forest School Entrance Examination.

The following order of the Inspector-General of Forests, issued with the approval of the Board of Control of the Forest School, may interest some of our readers.

In supersession of previous orders, the pass-marks to be obtained in each of the subjects of the School entrance-examination in the English course will in future be as follows:—

(1) English { Conversation ...	...	50 per cent.
(1) English { Composition ...	...	33 ditto.
(2) Arithmetic, all branches ...	...	40 ditto.
(3) Algebra, up to Quadratic Equations	...	40 ditto.
(4) Elementary Plane Geometry ...	...	25 ditto.
(5) Mensuration (lengths, areas, volumes)	...	25 ditto.

Travelling Allowance of Foresters.

A recent Resolution of the Government of India authorizes the grant by Local Governments to Foresters not in charge of Ranges, of Travelling Allowance at the ordinary rates, when their duties necessitate the keep of a horse or pony or the maintenance of other carriage. We suppose this will also meet Delta's complaint (July No., p. 253) and that those Foresters who are in charge of Ranges will now get the usual allowance in the C. P. as elsewhere.

IV.—REVIEWS.

Botanical and Afforestation Department of Hongkong.

We have received the annual report of the Botanic Gardens of Hongkong for 1891. Three pages out of seven are occupied with correspondence on the true origin of Chinese Ginger: some years ago the British Consul at Swatow started the idea that preserved ginger was furnished by the plant called *Alpinia Galanga*, Willd. whereas the investigations of Messrs Groom and Ford have conclusively proved that *Zingiber officinale* Linn. is the true source of preserved ginger as we know it, the mistake having arisen from the resemblance of the Chinese names, Leung Keung for the produce of *Alpinia*, and Yuk Keung for the true ginger.

Part of the duty of the Superintendent is to grow plants which are lent for decorative purposes when public entertainments are given, and a careful record is kept of the number supplied on loan; it does not appear that any damage is done to these.

Under Forestry, we have plantations in which 115,081 trees were put out, chiefly *Pinus sinensis*, and natural seedlings and shoots springing up wherever protection is assured, but the want of water renders the work more and more difficult every year.

The following remarks on grass fires will be read with interest:—

"The year has been one of the greatest immunity from fires 'which has been known. Only 10 fires are recorded, and most of 'them were confined to the destruction of grass only. Fires which 'occurred within plantations were confined to very small areas, 'only 700 trees having been destroyed. There were 64 fires and '107,000 trees destroyed in 1890. The great immunity from fires 'was due to vegetation being less dry at the seasons of ancestral 'grave worshipping in spring and autumn when, as a rule, fire 'has hitherto been very carelessly handled at the graves scattered 'over the hills; and also, in all probability, partly owing to the 'exercise of more care in the use of fire in consequence of worshippers having been impressed with the importance of the prevention of fires."

'Old fire barriers to the extent of 26 miles were cleared, and, '20 miles of new ones made during the months of August 'September and October, the work being completed by the com'mencement of the dry season, during which all destructive fires 'arise. Every year gives evidence of the usefulness of these fire 'barriers in arresting the spread of fires.

'The unburnt remains of trees destroyed by fire in 1890, were 'all removed and sold as quickly as possible in order to prevent 'the inhabitants gaining any advantage by their being able to 'remove them for their own uses.

Thinnings are carried on in the plantations whenever the trees are too crowded and 59,000 pines were thus removed during the year, and sold for 601 dollars, the total revenue being a little more than this. The expenditure of the department is not stated.

The Madras Report of 1890-91.

In our May number we briefly reviewed the Madras Forest Administration Report for 1890-91. We have now received the orders of the Government of India on it. In these orders we see it laid down that "there are doubtless zones where, chiefly for 'climatic reasons, no natural fruits grow, but mere sterility 'should not as a rule be held to be a bar to the formation of 'reserves or to the fostering of the growth, which of itself eventu- 'ally may create a more fertile soil." This is no doubt, sound, if not very clear; the district referred to is Chingleput, which like all the Carnatic country has tracts of laterite uplands and occasional more or less stony hills which are usually covered with scrub of a sort largely intermixed with prickly pear. If let alone, this scrub grows excellently, and there can be but little doubt but that in Chingleput, and indeed in all parts of the Madras Presidency, natural forests did grow at one time, for we find their unmistakeable remains everywhere, and know that even centuries of hacking and goat grazing have not entirely destroyed them.

The Government of India and that of Madras do not seem entirely to agree on the question of special fire-protective measures in forests likely to be thrown open to grazing, for while the former consider such measures unnecessary, the latter think that "partial protection of tracts open to grazing may have 'a considerable effect in preventing wanton firing and limiting 'accidental fires." We are entirely with the Madras Government in this and would go further: there are good reasons why grazing areas should be protected; one is because fires most undoubtedly destroy the finer succulent grasses and foster the strong hard, nearly inedible kinds; another, because there is rarely such a wide line of natural demarcation between areas grazed and areas not grazed so that if fires are allowed in the one they naturally spread to the other unless expensive measures are taken. Every Forester knows that, bar incendiarism, it is just as easy and as cheap to protect a large tract of well defined boundary as a series of small ones. The rule should be that, which we think the Madras authorities maintain;—no fires allowed in any areas under

protection, but specially expensive protective measures only in the more valuable Reserves.

There is not much else to notice in the papers received, except the approval of the Government of India of the system of growing trees, with agricultural crops exemplified in Tinnevelly with the Umbrella tree, *Acacia planifrons*. We should be glad if some of our Madras subscribers would tell us something about this, for we are not quite clear what it is that is being done.

V.—SHIKAR, &C.

Extraordinary Capture of Wild Elephants.

An interesting and extraordinary capture of wild elephants by the "Pit system" took place on the Anaimalai Hills in the Government Reserved Forest on the night of the 22nd instant.

It was only on the 17th instant that I arrived at the Mountstuart Camp and gave directions that the elephant pits used last year should be prepared for further captures. On Monday the 19th, six pits were completed and duly covered, ready for the animals to fall into. It was on this day that the Conservator of Forests, Mr. Cherry, arrived at Mountstuart to continue his inspection of the South Coimbatne District. The Pits are arranged in groups of three within a quarter of a mile apart.

Three nights passed off without a fall having occurred. On Thursday night, however, the 22nd instant, about 8 P. M., frantic cries of elephants were heard coming from the locality in which the pits were situated, and we at once thought that a fall must have taken place. I proceeded at once to the pits, after having given directions for the tame elephants, and ropes, &c., to be brought, and taking with me all the Mulcers(*i.e.* hillmen) who happened to be in the neighbourhood of the Camp.

After driving away the herd of elephants which was hanging around, we approached the three pits to which we had been directed by the cries of the animals, and discovered that an extraordinary fall had taken place. Into two of the pits single animals had fallen, and into the third a Cow with a calf had fallen ; thus, four elephants had fallen into the three pits. I immediately sent word to the Conservator who soon joined us at the pits, and in the meantime the Ranger and some more subordinates with the tame elephants had arrived.

We set to work to take the animals from the pits and transfer them to the kraals, but the two animals in the same pit gave a great deal of trouble, and it was not until 6-30 a. m. on the 23rd morning that we succeeded in getting them out of the

pit. The young one kept close beneath its mother and consequently it was difficult to noose it. The old cow was very much exhausted and lay down several times on the way to the kraals; however, she was eventually taken to them all right as also the calf, and the tame elephants were then brought back to extract the other two. The latter gave very little trouble, and by 7 p. m. of the 23rd, they also had been put safely into the kraals, thus, within 24 hours after the fall, all four animals had been transferred from the pits to the kraals. All the elephants with the exception of the big Cow seem to be doing well. Their sizes are as follows :—

1	Cow elephant	... height	8 feet.
1	Male calf	... „	4 „
1	Smaller Cow	... „	6¼ „
1	Still smaller Cow	... „	5 „

P. S.—Since writing the above, another fall has taken place which renders the capture still more interesting. It was only on the 23rd instant at about 7 p. m. that the first four elephants were taken out. There then only remained three pits ready for the animals to fall into. At six o'clock on the morning of the 25th, I heard cries again coming from the pits and proceeded to the spot and found three more elephants, a young one in one of the pits and two big ones in another, whilst the third remained untouched. The animals were safely removed to the kraals by 4 p. m. the same day.

H. B. BRYANT.

Dehra Dun Camp of Exercise.

The following were the prizes won by Forest School Officers and Students at the Camp of Exercise of the Mounted Rifles in the Dún.

Shooting, 200 and 300 yards ...	Corpl. Rivett, 3rd.
„ , 300 and 600 „ ...	Sergt. Lane-Ryan 2nd.
Capt. Armstrong's Cup, 2nd prize ..	Trooper Ryan.
Reserve Company Shooting, 3rd prize	A. F. Gradon.
Chart and Compass Race, 2nd prize	Trooper Jackson.
Section competition, 2nd prize ...	Sergt. Allen.
do. 4th „ ...	„ Pierce.
Postilion Race, 1st „ ...	Sergt. Lane-Ryan.
Lime cutting, 1st „ ...	do.
Boot and Saddle Race, 1st „ ...	do.
do. 2nd „ ...	Sergt. Allen.
Tent Pegging, 1st „ ...	Sergt. Lane-Ryan.
Victoria Cross Race, 1st „ ...	Trooper Tweedie.
Tug of War, ...	Forest School Team.
Col. Harington's Cup for best sportsman ...	Sergt. Lane-Ryan.

VI.—EXTRACTS.

New method of Preserving Potatoes.

The Society for the encouragement of national industry in France, has recently awarded a prize of one thousand fracs to a Mr. Schribaux for a method of preserving potatoes which he has invented. It is well known that in the spring when the young shoots or sprouts of the potato develop, the tuber gives up its reserve material, begins to deteriorate, and soon becomes unfit for consumption. Various methods have been devised, with more or less success, to prevent this, most of them being founded on the principle of keeping out the air.

Mr. Schribaux' method forms quite a new departure, in that he kills the buds without injuring the tubers. His method consists in immersing the potatoes in a sulphuric acid bath for a period of 12 to 15 hours ; they are then taken out, thoroughly dried and stored. Small depressions are seen in place of the " eyes " which have been completely destroyed, but the skin of the tuber remains smooth and sound.

The strength of the both should be two parts of the sulphuric acid of commerce to one hundred of water, and it will serve over and over again ; moreover the solution is so weak that it can be handled with impunity, and placed in any sort of vessel.

Some potatoes treated on this method were examined in September, when they had been nine or ten months out of the ground and it was found that they had the same composition and the same nutritive value as in the previous May, the only difference being that they had lost a little moisture.
(Révue Agricole of the Mauritius.)

A. S.

Barre and the discovery of the Coco-de-mer.

Visitors to Kew Gardens who have lately watched with interest the highly curious—indeed, most remarkable—germination and growth, in the warm Lily-tank house, of the once mysterious Coco-de-mer, may be pleased to learn the particulars of its original discovery in the Seychelles Islands; whence it is now named the *Lodoicea seychellarum.*

This group of small islands, some 5 degrees south of the equator, and 55 degrees east of Greenwich, is supposed to have been first discovered, as far as Europeans were concerned, by the Portuguese, early in the sixteenth century, possibly in 1506, by Fernando Suarez, and named The Seven Brothers. It was not, however, until 1742, that the enterprising Governor of the Isle of France, Labourdonnais, sent Captain Lazare Picault in the *tartane* "Elizabeth" to take possession of these apparently unimportant islands; and they were subsequently visited and settled by M. Moreau de Seychelles, one of the chief officers of the French East India Company, after whom they were named—the French Minister at that time being also his relative, the Viscount Hérault de Seychelles. In 1750, a Governor was appointed to Mahé, the principal island, under the control of the Governor of the Isle of France.

It is, however, to that skilful and observant engineer officer, Monsieur Barré, that we owe the first exact and detailed survey of the various islands composing this archipelago of twenty-nine islands and islets in the year 1769, which he undertook, by the special desire of that brave navigator, Captain Marion de Fresne, who was massacred with two boats' crews at the Bay of Islands, in New Zealand, during June, 1772.

Second in importance to Mahé, and 21 miles north-east of it, is the island of Praslin, with an area of some 27 square miles. It was here that Barré landed one fine morning for the purpose of surveying the coast of the island, which, from the number of conspicuous cocoa-nut trees was then named the Ile de Palme. Wandering outside the thickets and scrub, along the coral beach, he saw before him a huge fruit, which he at once conjectured must be a Coco-de-mer; but as it was just on high water mark, he thought it had been washed up by the sea, and not being acquainted with the size or shape of Coco-de-mer, of which he had only heard by reputation, or only seen when nuts without their enveloping husk, he was not at all sure that it was one. However, knowing the rarity and costly value of a unique specimen (which, up to that date, had been sold in the markets throughout India and China in small pieces for its weight in silver), he carefully concealed the fruit, which weighed at least 50 lb., out of sight, until he could transport it safely to his ship. But on leaving the shore, rather priding himself on his lucky discovery of a prize, what was his surprise and indeed mortification to find the ground under the tall Palm trees covered with numbers of these nuts in all stages of germination, whilst looking up at the mighty Palms above him he saw that these fine trees bore the same fruit. He had discovered the true habitat of the wonderful tree heretofore unknown to science: a tree so wonderful that General Gordon, more than a hundred years afterwards, declared that is must have sprung from the tree of knowledge which originally grew in Eden in pre-Adamite times.

No wonder that at first sight the poor engineer, who had thought to fill his purse with fifty pounds of silver in exchange for his Coco-de-mer, felt some vexation,* foreseeing that as soon as the wonder-working fruit, which was supposed to be the product of the sea, became recognised as a terrestrial natural object, its fictitious value in the oriental markets would speedily become a thing of the past; and rightly he judged, for the Coco-de-mer is now only of value as a botanical curiosity.

He found these magnificent double Coco Palms to elevate their crests to a height of at least 50 (French) feet; their summits to be crowned with a tuft, or huge plume, of about a dozen fronds, each 20 feet in length, and somewhat in the form of a fan; and each of these great leaves to be supported on a stipe 6 feet long, which is hollow or indented (*échancré*) in its contour. From the axilla (*aisselle*) of the leaves, issues a panicle, with the branches which bear the female blossoms. The pistil of these flowers he found to produce at maturity the huge fruit which, with its husk, weighed, as before observed, some fifty pounds.

On reflection, and after careful examination of this large grove (Rochon calls it a forest), Barré was persuaded that this Coco Palm was not the real Coco-de-mer of commerce—not the true sea-borne double Coco-nut, whose recuperative qualities were so highly esteemed by the enervated Moguls of India. Nevertheless, out of sheer curiosity, he collected some three dozen of the nuts, and took them with him to the Isle of France, where the celebrated botanist, M. Pierre Poivre, instantly recognised them as the true fruit so much sought after; and as M. Poivre was at this time the Intendant and Commissary of Marine of the French Colony, he and the Governor, the Chevalier Des Roches, instantly accelerated the departure of Captain Grenier,† who, assisted by Rochon, was about to sail for India, with instructions to visit the Isle de Palme, or Praslin as it was now named, and obtain some germinating nuts and young plants for the Government Botanical Gardens then being formed at Pamplemousses and at Le Reduit.

Accordingly, on May 30, 1769, the "Heure du Berger" and the "Verd-Galand," commanded by Captain Grenier and Lieutenant Law Fontaine respectively, left Port Louisa; and on June 2, the day of the transit of Venus, these ships were off the Vigie bank, reaching the Seychelles on the 13th of the same month. Rochon speaks feelingly of the danger he encountered in journeying to and fro from the ship to his observatory on shore. Crocodiles! sharks and torpedos, we are assured, did great damage, and several of his men were bitten or wounded by these animals. We cannot help thinking that the torpedos were less dangerous than the spikes of the mud-laffs! However, Alexis Rochon duly

* "Il vit avec peine," says Rochon, "que la terre etoit couverte de ces fruits et des arbres qui les portoient." (*Voyages aux Indes Orientales*, p. 148).

† It was this Capitaine Grenier who discovered the short sea route to India for sailing vessels during the North—East Monsoon.

visited the Isle de Palme, and industriously collected a quantity of the young plants and nuts of the great Coco trees, the Cocos-de-mer, which he classified as a species of Latania. Filled with zeal, he transported several specimens, as well for the Museum of Natural History of Paris, as well as a young growing tree 20 feet in length.

Now comes the curious part of the story, which may be given in Rochon's own terms :—"On my return to Europe, I 'brought to the Academician, Louis Guillaume Lemonnier (brother 'of the astronomer), the doctor, a fine Coco-de-mer (for so it is 'called), which had germinated in my trunk by the heat of the 'hold. The young shoot was doubtless arrested, for it ceased to 'grow in spite of all the care which this scientific botanist took to 'restore its life. The form of this fruit and of its germ contributed 'not a little to the celebrity of this Nut, designated by botanists 'under the denomination of Nux medica ; the Indians regard it 'not only as a powerful antidote and counter-poison, but also as an 'excellent remedy for venereal diseases."

It is curious that Pickering gives no account of this discovery in his *Chronological History of Plants*; although he mentions the double nuts of the *Lodoicea seychellarum* as having been found by Hieronimo di Santo Stefano on the Maldive Islands in 1496. He wrongly states that this Cocos maldivica was first ascertained by Sonnerat to be a native of the Seychelles Islands. *S. Pasfield Oliver, Captain, late Royal Artillery,—(Gardener's Chronicle).*

Pruning in Parks and Gardens.

In the afternoon a lecture was delivered by Mr. Thiselton-Dyer on the "Management of Trees in Parks and Gardens," and in commencing, the lecturer observed that he might venture to say, the subject he was about to speak upon did not receive so much attention in this country as it used to do, but he believed that if more attention be not given to it, we shall fail to hand down to our successors such fine specimens of ornamental and other timber as our ancestors left for us. Mr. Dyer said that it was a mistaken notion that the best trees are obtained by isolated planting, and said that the finest examples of timber trees in the country had been secured rather from judicious thinning than from the system just referred to, and instanced some of the woods at Kew, which they had evidence to prove had been planted thickly, and then successively thinned out, as being far superior to some planted at a later date, when our Royal family had less time to cultivate their timber, on account of the ill health of the sovereign. The finest trees could only be obtained by thick planting, and the consequent extensive sacrifice of less desirable timber. Mr. Dyer

thought that height was the first point to be obtained in an ideal tree. The axis should be kept entire, a well-balanced bole should be secured, and the branches should not be too long, for if such be the case it is probable that damage will be sustained through the effect of wind or snow. The worst possible form is that which he might describe as the Cabbage-headed tree. It is nothing but a gigantic bush, and the vast majority of trees are prone to this habit; but there are several influences that tend to create the Cabbage-headed growth, and the principal one was the loss of the leader. When a tree is planted in the open, it is exposed to all the cold winds, &c., and the result of a really hard winter or spring is that the leader is killed, after which it can only be restored by artificial treatment.

Pollards, the lecturer said, bore evidence that they had been tended until they had developed an unusually large bole before cutting for fire-wood. Forking was not quite so bad a form as the Cabbage-head, but still, a forked tree was extremely liable to be split by the force of wind playing upon one-half of the tree, and after that had taken place, and an opening had been made for disease and decay, they will not last any great length of time.

In pruning young trees (and all trees need looking to in this respect), steps must be taken to prevent excessive growth of the lateral branches. If the laterals are shortened, the leaders are strengthened to the same extent, and the lateral branches never appear to assume the habit they had of unduly extending themselves. Staking had its drawbacks as well as its advantages, and Mr. Dyer said that he had lately found that Mr. Waterer, by pruning the lateral growths has been able to dispense with any kind of staking. His own experience, however, did not quite justify such a step. But even after a tree has been staked, the necessity will still exist for pruning, and if the head is allowed to become unduly large, it is liable to be broken off. In fact, it will require more pruning than if it were not staked at all. Mr. Dyer then referred to the attacks of animals and cattle that trees were subjected to, and said that the French, who make their trees an especial study, recommended that the trees be painted with coal-tar, The lecturer had seen road metal placed around the trees to prevent cattle injuring them; they dislike to stand upon it or walk across it.

In regard to the preservation of old trees, the lecturer gave a detailed description of the bark with which the trunk of a tree is covered, and of the vital importance it was to the tree that the bark should be not injured or abraded, and declared that even in this matter timber trees were almost universally neglected. Mr. Dyer then gave directions as to the covering of any place that had become denuded of bark, recommending that the place should be scraped, and the whole then painted with coal-tar. This, the lecturer said was better than anything that becomes hard, and it never

gets quite set, thus allowing the gradual closing up of the healthy tissues, and the closure of the wound to go on. It also acts as an antiseptic. Mr. Dyer then said that branches, when cut off, should be cut close to the trunk, for that if a piece of the shoulder were left, it would decay, and disease would enter the tree, and its end sooner or later would be assured. If the branch is cut off in the manner advised, the bark will gradually close over and cover the cut. The lecturer then spoke of several species of fungi that attack trees, and gave directions for preventing the mischief arising from them.

Sir Trevor Lawrence, who occupied the chair, spoke of the Beech trees in some parts of Surrey that were dying off in hundreds, and, as they were planted upon the chalk, he presumed that they had exhausted the humus contained in the small quantity of soil they had got; but some of the cases could not be accounted for in that way, and he would like to show them to the lecturer, that he might give his opinion as to what was the cause of their death.—*(Gardener's Chronicle).*

New Appointment of Colonel Bailey, R. E.

The following extracts may interest our readers.

THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.—At a meeting of the Council of the Royal Scottish Geographical Society held yesterday afternoon, Lieutenant-Colonel Bailey, R. E., was unanimously appointed Secretary in succession to Mr. Silva White. Lieutenant-Colonel Bailey is Lecturer on Forestry in the University of Edinburgh, and was for several years a Conservator of Forests under the Government of India. He also organised the Central Forest School in India. There were in all 42 applications.

THE anniversary dinner of the Royal Scottish Geographical Society was held last night in the Waterloo Rooms, Edinburgh. The chair was occupied by the Marquis of Lorne. The croupiers were Mr. A. L. Bruce, the hon. Treasurer of the Society, and Mr. J. G. Bartholomew, the hon. Secretary; and the company present included Professor Geikie, Dr. John Murray, Mr. Silva White (who recently retired from the Secretaryship of the Society), Colonel Bailey, R E. (the new Secretary).

Sir R. MURDOCH SMITH proposed.—" Our new Secretary," and said, while the feeling of regret which they all entertained at Mr. Silva White's retirement must remain unabated, any feeling of trepidation as to the future that they might have had,

must not only have been greatly alieviated, but entirely removed by the good fortune which had befallen the Society in securing the services of Colonel Bailey. (Applause.) Giving an outline of Colonel Bailey's career, Sir R. R. Murdoch Smith mentioned specially that for many years he had engaged in the conservation of the great forests of India, and in the organising and supervising of special forestry officers for that branch of the public service.

Lieutenant-Colonel Bailey, in responding, observed that the fact that his election was the result of a unanimous vote had been a source of great gratification and encouragement to him in undertaking his new duties, and he assured the members that his best efforts would be devoted to the affairs of the Society, so long and ably conducted by Mr. White. (Applause.)

Wood Concrete.

A new wood concrete, according to the *Bauteehnische Zeitschrift*, has been invented in Germany. Shavings and planing mill chips, either of common or fancy goods, which may be stained before use, if desired, are mixed with cheese, or, rather, casein, calcined magnesium, limestone, glycerine, silicate of soda, and a little linseed oil and this queer mess is forced by hydraulic pressure into moulds, where it is allowed to harden. When dry, the composition is strong and solid, and can be sawn, planed, polished, and varnished. It is expected that it will be found useful as an "ornament" in the shape of panels, or as a covering for entire wall surfaces.—*(Timber Trades Journal.)*

VII—TIMBER AND PRODUCE TRADE.

Statement of average selling rates of timber and bamboos in Meerut, Cawnpore, Bulandshahr, Bareilly, and Moradabad for the quarter ending 30th June, 1892.

Description.	Timber Scantlings per score.		Bamboos per 100 score.		Remarks.
	From	To	From	To	
MEERUT.	R. A. P.	R. A. P.	R. A. P.		
Sal 10′ Tors (Poles) ...	8 0 0	18 0 0	...	...	
Sal & Sain, &c. Karris, 12′ × 5″ × 4″ ...	25 0 0	40 0 0	...	...	
Sal bed posts, 7′ × 2½″ × 2½″ ...	8 0 0	10 0 0	...	...	
Bamboos of 9′ to 10′ per 100 score ...	...	...	28 0 0	80 0 0	
CAWNPORE.					
Sal 10′ Tors (Poles) ...	5 0 0	10 0 0	...	...	
Sal, Sain &c. Karris, 12 × 5′ × 4″	7 0 0	10 0 0	...	...	
Sal bed posts, 7′ × 2½″ × 2½″ ...	2 8 0	3 0 0	...	...	
Bamboos of 9′ to 10′ per 100 score ...	...	...	20 0 0	30 0 0	
BULANDSHAHR.					
Sal 10′ Tors (Poles) ...	...	...	...	...	
Sal, Sain &c., Karris, 12′ × 5″ × 4″ ...	...	...	...	...	
Sal bed posts, 7′ × 2½″ × 2½″ ...	...	...	...	...	
Bamboos of 9′ to 10′, per 100 score ...	...	...	50 0 0	50 0 0	
BAREILLY.					
Sal 10′ Tors (Poles) ...	5 0 0	10 0 0	...	...	
Sal Sain, &c. Karris, 12′ × 5″ 4″	25 0 0	35 0 0	...	...	
		40 0 0	...	...	
	50 0 0	60 0 0	...	...	
Sal bed posts 7′ × 2½″ × 2½″ ...	10 0 0	15 0 0			
Bamboos of 9′ to 10′, per 100 score ...	...	...	50 0 0	137 8 0	
MORADABAD.					
Sal 10′ Tors (Poles) ...	20 0 0	25 0 0	...	...	
Sal, Sain, &c., Karris, 12′ × 5″ 4″ ...	30 0 0	50 0 0	...	...	
Sal bed posts, 7′ × 2½″ × 2½″ ...	10 0 0	12 8 0	...	...	
Bamboos of 9′ to 10′, per 100 score ...	...	...	50 0 0	100 0 0	

Churchill and Sim's Circular.

November 5th, 1892.

EAST INDIA TEAK.—Small stocks, small deliveries and low, although improving prices continue to be the features of this trade. A very small addition to the demand would quickly and materially improve the position, but of that it is not easy at present to discover the promise. The deliveries have been, for October, 778 loads, against 929 and 1,574 respectively in the two preceding years ; and for the first ten months 8,434 loads, against 12,321 and 14,500 respectively.

ROSEWOOD.—East India —Sales are not easily effected as there is no activity in the demand.

SATINWOOD.—*Logs*, unless of good sizes and figury, rule low, the demand is dull ; *planks* and *boards* should not be shipped.

EBONY.—Stores are heavy and the demand dull.

Price Current.

Indian Teak	per load	£9 10	to	£15
Cedar, Malabar,	per sup. ft.	3d	to	3¾d
Satinwood	per ton	£5	to	£10
Rosewood	per ton	£5	to	£9
Ebony	per ton (nominal)	£5	to	£8

MARKET RATES FOR PRODUCTS.

(Tropical Agriculturist, November, 1892)

Cutch	per cwt.	20s.	to	32s.
Croton seeds	„	15s.	to	20s.
Gum Arabic, Madras	„	40s.	to	80s.
Gum Kino	„	90s.	to	100s.
India Rubber, Assam	per lb.	1s. 6d.	to	2s. 1d.
„ Rangoon	„	1s. 5d.	to	1s. 9d.
Myrabolams, Bombay	per cwt.	9s.	to	10s. 6d.
„ Jubbulpore	„	8s.	to	9s. 6d.
„ Godavary	„	8s.	to	9s.
Tamarinds	per cwt	8s.	to	9s.
Nux Vomica, good	„	8s.	to	9s. 6d.
Orchella, Ceylon	„	20s.	to	25s.
Redwood,	per ton	£3.	to	£3 10s.
Sandal wood, logs	„	£35	to	£60
„ chips	„	£9	to	£30
Sapanwood	„	£4	to	£7

VIII.—EXTRACTS FROM OFFICIAL GAZETTES.

1.—Gazette of India.

28th October, 1892.—No. 1326 F.—Furlough for one year, under Article 340 (*b*) of the Civil Service Regulations, is granted to Mr. A. E. Wild, Conservator of Forests, 3rd (officiating 2nd) Grade, Central Circle, North-Western Provinces and Oudh, with effect from the 23rd October 1892, or the subsequent date on which he may avail himself of it.

No. 1328 F.—With reference to the Notification of this Department, No. 532-F, dated the 6th May 1892, the appointment as Assistant Conservators of Forests, 2nd Grade, of the officers mentioned therein, took effect from the dates specified below instead of from those given in that Notification :

Mr. Leete,—21st December 1891.
„ Carr,—3rd January 1892.
„ Tulloch,—21st December 1891.
„ Edie,—21st December 1891.
„ Hatt,—29th December 1891.
„ Trafford,—29th December 1891.
„ Long,—29th December 1891.

3rd November 1892.—No. 3221—45.—The services of Mr. E. C. Cotes, Officiating Deputy Superintendent of the Indian Museum, are transferred to the Forest School at Dehra Dún for two months, with effect from the 9th October 1892, and Mr. R. L. Chapman, Officiating First Assistant, is appointed to the charge of the current duties of the Deputy Superintendent during Mr. Cotes' absence.

4th November 1892.—No. 1421-F.—Mr. A. E. Wild, Conservator of Forests, 3rd (officiating 2nd) Grade, Central Circle, North-Western Provinces and Oudh, availed himself on the forenoon of the 25th October 1892 of the furlough granted him in the Notification of this Department, No. 1326-F., dated the 28th ultimo.

No. 1423 F.—The following appointments and reversions are made in consequence of the return to duty from furlough of Messrs. Bagshawe and Home, Conservators of Forest.

Mr. C. Bagshawe, Conservator, 2nd Grade, is appointed temporarily to the charge of the Central Circle in the North-Western Provinces and Oudh, and will officiate in the 1st Grade of Conservators until further orders. Mr. E. P. Dansey, Officiating 1st Grade Conservator, Bengal, reverts to the 2nd Grade of Conservators.	With effect from 25th October 1892.

Mr. A. L. Home, Conservator, 1st Grade, is appointed to the charge of the Western Circle in Upper Burma. Mr. R. H. C. Whittall, Officiating 1st Grade Conservator, Punjab, reverts to the 2nd Grade of Conservators. Mr. P. J Carter, Officiating 2nd Grade Conservator, Pegu Circle, Lower Burma, reverts to the 3rd Grade Conservators. Mr. T. H. Aplin, Officiating Conservator, 3rd Grade, Western Circle, Upper Burma, reverts to his substantive appointment of Deputy Conservator, 2nd Grade.	With effect from 28th October 1892.

2.—MADRAS GAZETTE.

7th November, 1892.—*No.* 445.—Under the provisions of section 2 of the Madras Forest Act V of 1882, the Right Honorable the Governor in Council is pleased to empower the undermentioned officers to try forest offences :—

M. R. Ry. R. V. Krishnaswami Aiyar, Deputy Tahsildar and Third-class Magistrate of Denkanikota, in the district of Salem.

9th November, 1892.—M. R. Ry. C. Venkoba Rao, Deputy Tahsildar and Third-class Stationary Sub-Magistrate of Bellary, in the district of Bellary.

7th November, 1892.—*No.* 446.—Under the provisions of section 2 of the Madras Forest Act V of 1882, the Right Honorable the Governor in Council is pleased to empower the undermentioned Deputy Tahsildars and Third-class Magistrates of the South Arcot district to try forest offences :—

M. R. Ry. T. Ramanjulu Nayudu, Villupuram taluk.
M. R. Ry. P. Narayana Chari, Tiruvannamalai taluk.
M. R. Ry. S. Kristnaswami Aiyar, Tirukoilur taluk.
M. R. Ry. V. Murugasa Pillai, Kallakurchi taluk.
M. R. Ry. C. P. Doraswami Chetti, Tindivanam taluk.

7th November, 1892.—To Sub-Assistant Conservator Mr. T. G. A. Gaudoin leave for three months, from 1st December 1892, under article 291 of the Civil Service Regulations.

21st November, 1892.—*No.* 526.—Mr. T. N. Hearsey, Acting District Forest Officer, Kurnool, is granted privilege leave for one month, under article 291 of the Civil Service Regulations.

No. 527.—Mr. H. H. Ward, Acting District Forest Officer, Godavari, is granted privilege leave for three months, under article 291 of the Civil Service Regulations.

21*st November*, 1892.—*No* 530.—Appointments.

No.	Name and designation of officer.	Present grade.	Grade to which promoted or reverted.	Nature of promotion or reversion.	With effect from
1	Mr. A. W. Lushington ...	Deputy Conservator of Forests, Third Grade.	Deputy Conservator of Forests, Second Grade.	Acting ...	Date of Mr. Lushington joining his appointment as District Forest Officer, Kistna.
2	Mr. F. A. Lodge ...	Acting Deputy Conservator of Forests, Second Grade.	Deputy Conservator of Forests, Third Grade.	Permanent	
3	Mr. P. M. Lushington ...	Acting Assistant Conservator of Forests, First Grade.	Deputy Conservator of Forests, Fourth Grade	Do. ...	Date of passing the Higher Standard in Telugu.

No. 531.—Posting.

No.	Name of officer.	Circle.	Nature of charge.	Remarks.
1	Mr. A. W. Peet ...	Northern Circle.	Conservator of Forests.	...

14*th November*, 1892.—The two months' leave granted to Ranger M. Shumsuddien Sahib and notified at page 1355, Part II of the *Fort St. George Gazette*, dated 4th October 1892, is extended by one month, *i. e.*, up to 8th December 1892, and the acting arrangement made in consequence of his absence will continue.

3. Bombay Gazette.

27*th October*, 1892.—No. 8431.—In exercise of the power conferred by Section 4 of the Indian Forest Act, No. VII of 1878, as amended by Act No. V of 1890, and in supersession of all notifications appointing Forest Settlement Officers in Sind, His Excellency the Governor in Council is pleased to appoint Mr. R. P. Barrow, I. C. S., to do duty as Forest Settlement Officer in Sind, for the purposes set forth in Section 4, clause (*c*), and Section 34 of the said Act, and in respect of all lands in the Province of of Sind up to this date notified as proposed Reserved Forests under Section 4 or as Reserved Forests under Section 34, which have not since been disforested under Section 26, and in respect of which the enquiry into rights contemplated by clause (*c*) of Section 4 of the said Act has not yet been made

2. Under Section 16 of the said Act His Excellency the Governor in Council is also pleased to appoint the Collectors and Deputy

Commissioners in Sind to hear appeals from any orders passed by the said Forest Settlement Officer under Sections 10, 11, 14 or 15 of the said Act.

3. His Excellency the Governor in Council is pleased to direct that the enquiry and record in respect of the Protected Forests of Sind shall be made and prepared in the same manner and subject to the same provisions and right of appeal as in the case of Reserved Forests.

4th November, 1892. Under paragraph 2 of Government Resolution No. 8315 of the 22nd October 1892, Mr. Dattatraya Manjunath Bijoor, substantive *pro tem.* Extra-Assistant Conservator of Forests, is appointed to do duty as Personal Assistant to the Conservator of Forests, Southern Circle.

8th November 1892 No.—8796.—His Excellency the Governor in Council is pleased to appoint Mr. R H. Madan, L. C. E., on return from leave, to do duty as Divisional Forest Officer, East Khandesh ; and to post Mr. H. Mainwaring, on return to duty, to the Southern Circle as Working Plans Officer.

15th November, 1892, Messrs. W. R. Woodrow and G. K. Betham, Deputy Conservators, respectively delivered over and received charge of the Southern Division of Canara on the forenoon of the 27th October 1892.

4.—Bengal Gazette.

The 7th November, 1892.—No. 3824 F.—Mr. C. G. D. Fordyce, Deputy Conservator of Forests, in charge of the Chittagong Forest Division, is granted privilege leave for two months, under article 291 of the Civil Service Regulations, with effect from the forenoon of the 17th October, 1892.

8th November, 1892.—No.—3840—Mr. H. H. Davis, Deputy Conservator of Forests, having been permitted by the Secretary of State to return to duty within the period of the leave granted to him under the order dated the 4th June 1891, is posted to the charge of the Singhbhum Forest Division.

Mr. E. J. N. James, Extra-Assistant Conservator of Forests, on being relieved of the charge of the Singhbhum Forest Division by Mr. Davis, is attached to that Division for general duty.

11th November, 1892.—No.—3902.—Mr. F. Trafford, Assistant Conservator of Forests, on the expiry of the three months' examination leave granted to him in Notification, No. 2732 F. dated the 18th, July, 1892, is transferred to the Jalpaiguri Forest Division.

11th November, 1892.—No.—3903.—Mr. W. M. Green, Deputy Conservator of Forests, is appointed to be Personal Assistant to the Conservator of Forests, Bengal, from the date of his giving over charge of the Jalpaiguri Forest Division to Mr. F. B. Manson, Deputy Conservator of Forests.

11th November, 1892.—No.3904.—The following reversions are ordered in the Upper Controlling Staff of the Bengal Forest Department from the 30th September, 1892, the date on which Mr. F. B. Manson, Deputy Conservator of Forests, returned to duty from the leave granted to him in Notification, No. 2274 F. dated the 14th June 1892 :—

Mr. G. A. Richardson, Officiating Deputy Conservator of Forests, 2nd grade, to revert to his substantive appointment of Deputy Conservator, 3rd grade.

Mr. C G. Rogers, Officiating Deputy Conservator of Forests, 3rd grade (on deputaion), to revert to his substantive appointment of Deputy Conservator, 4th grade (seconded).

Mr. H. D. D. French, Officiating Deputy Conservator of Forests, 3rd grade, to revert to his substantive appointment of Deputy Conservator, 4th grade.

11*th November*, 1892.—No.—3905.—Mr. F. B. Manson, Deputy Conservator of Forests, in charge of the Jalpaiguri Forest Division, is posted to the charge of the Darjeeling Forest Division.

Mr. H. H. Haines, Officiating Deputy Conservator of Forests, in charge of the Darjeeling Forest Division, is posted to the charge of the Jalpaiguri Forest Division.

11*th November*, 1892.—No. 3906.—The following reversions are ordered in the Upper Controlling Staff of the Bengal Forest Department from the 15th October, 1892, the date on which Mr. C. A. G. Lillingston, Deputy Conservator of Forests, returned to duty from the leave granted to him in Notification, No. 3041 F. dated the 10th August 1892 :—

Mr. R. L Heinig, Officiating Deputy Conservator of Forests, 3rd grade, to revert to his substantive appointment of Deputy Conservator, 4th grade.

Mr. W. H. Lovegrove, Officiating Deputy Conservator of Forests, 4th grade, to revert to his substantive appointment of Assistant Conservator, 1st grade.

15*th November*, 1892.—No.—3861.— Consequent on the grant of two months' privilege leave to Mr. C. G. D. Fordyce, Officiating Deputy Conservator of Forests, 2nd grade, the following promotions are ordered in the Upper Controlling Staff of the Bengal Forest Department, with effect from the 17th October, 1892, or until further orders :—

Mr. G. A. Richardson, Deputy Conservator of Forests, 3rd grade, to officiate in the 2nd grade of Deputy Conservators.

Mr. R. L. Heinig, Deputy Conservator of Forests, 4th grade, to officiate in the 3rd grade of Deputy Conservators,

Mr. W. H. Lovegrove, Assistant Conservator of Forests, 1st grade, to officiate in the 4th grade of Deputy Conservators.

15*th November*, 1892.—No.—3951.—Under the provisions of section 25 (*i*) of the Indian Forest Act (VII of 1878), the Lieutenant-Governor is pleased to sanction the closing of the Reserved Forests in the Darjeeling Terai and Lower hills (Kurseong and Tista Forest Divisions), as well as those in the district of Jalpaiguri (Jalpaiguri and Buxa Forest Divisions)against hunting, shooting and fishing from the 15th December, 1892, to the 15th June, 1893, except with the written permission of the Conservator of Forests or the Local Government

15*th November*, 1892.—No.—3952.—Under the provisions of section 25 (*i*) of the Indian Forest Act (VII of 1878), the Lieutenant-Governor is pleased to sanction the closing of the Reserved Forests in the Singbhúm, Palamau and Hazaribagh Forest Divisions against hunting, shooting and fishing from the 15th December, 1892, to the 15th June, 1893, except with the written permission of the Conservator of Forests or the Local Government.

15*th November*, 1892.—No. 3953.—Under the provisions of section 25 (*i*) of the Indian Forest Act (VII of 1878), the Lieutenant-Governor is pleased to sanction the closing of the Reserved Forests in the Puri and Angul Forest Divisions against hunting and shooting from the 15th December, 1892, to the 15th June, 1893, except with the written permission of the Conservator of Forests or the Local Government.

5.—N. W. PROVINCES AND OUDH GAZETTE.

10*th November*, 1892.—No, 8780.—Under section 14 of Act X of 1882, Mr. B. A. Rebsch, Deputy Conservator of Forests, Bahraich, is appointed a Special Magistrate and is invested with the powers of a Magistrate of the 3rd class, within the limits of any Forest Division of which he may be in charge, for the trial of offences punishable under Act VII of 1878.

25*th November* 1892.—No. 5373.—With effect from the 24th June 1892, the date on which Mr B. B. Osmaston proceeded on leave—

Mr. A. P. Grenfell, Assistant Conservator of Forests, 1st grade, to officiate as Deputy Conservator of Forests, 4th grade.

No.—5374, With effect from the 1st August 1892 the date on which Mr. N. Hearle proceeded on privilege leave.

Mr. A. G. Hobart-Hampden, Officiating Deputy Conservator of Forests, 3rd grade, to officiate as Deputy Conservator of Forests, 2nd grade;

Mr. L. Mercer, Deputy Conservator of Forests, 4th grade, to officiate as Deputy Conservator of Forests, 3rd grade.

No.—5375. With effect from the 28th October 1892, the date on which Mr. N. Hearle returned from privilege leave and took charge of the Dehra Dún Forest Division—

Mr. A. G. Hobart-Hampden, Officiating Deputy Conservator of Forests, 2nd grade, to officiate as Deputy Conservator of Forests, 3rd grade;

Mr. L. Mercer, Officiating Deputy Conservator of Forests, 3rd grade, to revert to his substantive appointment as Deputy Conservator of Forests, 4th grade.

6.—PUNJAB GAZETTE.

3rd November 1892.—No. 497.—Mr. C. F. Rossiter and Babu Ladha Singh, Extra Assistant Conservators of Forests, respectively made over and received charge of the Montgomery Forest Division on the afternoon of the 5th October 1892, consequent on the former's departure on three months' privilege leave.

7.—CENTRAL PROVINCES GAZETTE.

1*st November* 1892.—No-4142.—The designation "Sub-Assistant Conservator" having been superseded by that of "Extra-Assistant Conservator," with effect from the 26th of February 1891, the Chief Commissioner is pleased to direct that from the date above specified the term "Sub-Assistant Conservators" as used in Notifications

already issued under Act VII of 1878, and under Act VII of 1887 amended by Act V of 1890, shall be held to mean "Extra-Assistant Conservators."

10*th November* 1892.—No. 4292.—Mr. Chunder Kumar Chatterji, Extra-Assistant Conservator of Forests, is transferred from the Chhindwara to the Nagpur Division.

10*th November* 1899.—No. 4293.—With reference to Notification No. 4292, dated the 18th November 1892, Mr. Chunder Kumar Chatterji and Mr. M. W. Fox-Strangways, I. C. S., Deputy Commissioner, Chhindwara, respectively surrendered and received charge of the Chhindwara Forest Division on the afternoon of the 26th October 1892.

10*th November* 1892.—No. 4294.—With reference to Notification No. 4292, dated the 10th November 1892, Mr. Chunder Kumar Chhatterji, Extra-Assistant Conservator of Forests,, assumed charge of his duties in the Nagpur Division on the afternoon of the 31st October 1892.

13*th November* 1892.—No. 4373.—Privilege leave for three months, under Articles 277 and 291 of the Civil Service Regulations, is granted to Mr. P. H. Clutterbuck, Assistant Conservator of Forests, Raipur, with effect from the forenoon of the 6th instant, on which date he availed himself of it.

Notification No. 3596, dated the 28th September 1892, is hereby cancelled.

15*th November* 1892.—No. 4402.—In Notifications Nos. 3177 and 3178, dated the 5th September 1892, Serial No. 20 in both lists, and it the last columns, Mr. J. L. Pigot should be shown as "Officiating Deputy Conservator of Forests, 3rd grade, seconded on deputation," with effect from the 29th December 1891.

24*th November* 1892.—No. 4536.—With reference to Government of India, Revenue and Agricultural Department (Forests), Notification No. 1328-F, dated the 28th October 1892, the name of Mr. H. S. Ker Edie, as a Supernumerary Assistant Conservator of Forests of the 2nd grade, is added at the end of the list published in Notification No. 3177, dated the 5th September 1892, showing the names and position of the officers on the combined Punjab—Central Provinces—Berar—Coorg list on the 29th December 1891.

8.—Burma Gazette.

19*th October* 1892.—No. 362.—The Chief Commissioner appoints Mr. D. L. Richardson, Myoôk, to succeed the Deputy Commissioner, Katha, as Forest Settlement officer, for the purpose of the enquiry ordered in this Department Notification No. 167, dated the 2nd October 1890.

No. 363.—The Chief Commissioner appoints Mr. D. L. Richardson, Myoôk, to succeed the Deputy Commissioner, Katha, as Forest Settlement Officer, for the purpose of the enquiry ordered in this Department Notification No. 38, dated the 27th February 1890.

22*nd October* 1892.—No. 364.—Mr. G. R. Long, Assistant Conservator of Forests, is transferred from the Toungoo Forest Division to the charge of the Myanaung subdivision of the Western division, Pegu Circle.

No. 366.—Mr. W. F. L. Tottenham, officiating Deputy Conservator of Forests, is appointed to the charge of the Prome Forest division in addition to his other duties.

24th October 1892.—No. 10.—Mr. C. W. Palmer, Deputy Conservator of Forests, reported his return from the privilege leave granted him in Revenue Department Notification No. 203, dated the 23rd June 1892, on the forenoon of the 19th October 1892.

29th October 1892.—No. 21.—With reference to this office Notifications Nos. 13 and 22, dated the 21st July and 29th October 1892 respectively, Mr. W. F. L. Tottenham, officiating Deputy Conservator of Forests, made over, and Mr. C. H. Hobart-Hampden, Deputy Conservator of Forests, received charge of, the Prome division, on the afternoon of the 27th instant.

No. 22.—With reference to Revenue Department Notification No. 366 (Forests), dated the 22nd instant, Mr. H. Carter, officiating Deputy Conservator of Forests, made over, and Mr. W. F. L. Tottenham, officiating Deputy Conservator of Forests, received charge of, the Prome division on the forenoon of the 24th instant.

31st October 1892.—No. 8.—With reference to Revenue Department Notification No. 325, dated Rangoon, the 13th October 1892, Mr. A. M. Burn-Murdoch, Assistant Conservator of Forests, made over, and Mr. C. W. Palmer, Deputy Conservator of Forests, received charge of, the Minbu division, on the forenoon of the 24th instant.

2nd November 1892.—No. 381.—In this department Notification No. 348, dated the 19th October 1892, *for* the words and figures "No. 244, dated the 9th August 1892," *read* "No. 244, dated the 19th August 1892."

3rd November 1892.—No. 382.—The following postings and transfers are ordered in the Forest Department :—

Mr. H. Slade, Deputy Conservator of Forests, on his return from furlough, to the charge of the Tharrawaddy Forest division.

Mr. G. Q. Corbett, Deputy Conservator of Forests, from Tharrawaddy to the charge of the Toungoo Forest division.

Mr. H. B. Anthony, Deputy Conservator of Forests, from Toungoo to the charge of the Thayetmyo Forest division.

9th November 1892.—No. 394.—The following alterations of rank are ordered in the Forest Department :—

(1) With effect from the 19th October 1892, consequent on the return of Mr. C. W. Palmer from privilege leave :

Mr. T. A. Hauxwell, Deputy Conservator, 3rd (officiating 1st) grade, to officiate as Deputy Conservator, 2nd grade.

Mr. C. E. Muriel, Deputy Conservator, 4th (officiating 2nd) grade, to officiate as Deputy Conservator, 3rd grade.

Mr. C. L. Toussaint, Assistant Conservator, 1st grade (officiating Deputy Conservator, 3rd grade), to officiate as Deputy Conservator, 4th grade.

(2) With effect from the 28th October 1892, consequent on Mr. A. L. Home's return from furlough and assumption of charge of the Western Forest circle, Upper Burma :

Mr. T. H. Aplin, Deputy Conservator, 2nd grade (officiating Conservator, 3rd grade), to officiate as Deputy Conservator 1st grade.

Mr. C. W. Palmer, Deputy Conservator, 2nd (officiating 1st) grade, to revert to his substantive appointment.

Mr. H. B. Anthony, Deputy Conservator, 4th (officiating 2nd) grade, to officiate as Deputy Conservator, 3rd grade.

Mr. G. F. R. Blackwell, Assistant Conservator, 1st grade (officiating Deputy Conservator, 3rd grade), to officiate as Deputy Conservator, 4th grade.

Mr. C. W. A. Bruce, Assistant Conservator, 2nd grade (officiating Deputy Conservator, 4th grade), to officiate as Assistant Conservator, 1st grade.

Mr. C. R. Dun, Assistant Conservator, 2nd grade (officiating Deputy Conservator, 4th grade), to officiate as Assistant Conservator, 1st grade.

No. 398—The Chief Commissioner appoints the Forest Officer in charge of the Yaw Forest division to assist the Forest Settlement officer in the enquiries ordered in this department Notification No. 11, dated the 21st January 1892, and No. 244, dated the 19th August 1892.

2nd November 1892.—No. 11.—Mr. E. A. O'Bryen, Deputy Conservator of Forests, reported his return from the privilege leave granted him in Revenue Department Notification No. 209 of the 29th June 1892, on the forenoon of the 24th October 1892.

5th November 1892.—No. 9.—Mr. C. W. A. Bruce, officiating Deputy Conservator of Forests, reported his return from the privilge leave granted him in Revenue Department Notification No. 224, dated the 4th August 1892, on the forenoon of the 4th November 1892.

8th November 1892.—No. 12.—With reference to Revenue Department Notification No. 390 (Forests), dated Rangoon, the 3rd November 1892, Mr. W. T. T. McHarg and Mr. E. A. O'Bryen, officiating Deputy Conservators of Forests, respectively made over and received charge of the Katha Forest division on the forenoon of the 4th November 1892.

8th November 1892.—No. 23.—With reference to Revenue Department Notification No. 382 (Forests), dated the 2nd instant, Mr. G. Q. Corbett, Deputy Conservator of Forests, made over, and Mr. H. Slade, Deputy Conservator of Forests, received charge of, the Tharrawaddy division on the forenoon of the 7th instant.

8th November 1892.—No. 24.—Mr. H. Slade, Deputy Conservator of Forests, reported his return from furlough granted him in Revenue Department Notification No. 53, dated the 12th March 1891, on the forenoon of the 5th instant.

14th November 1892.—No. 405.—The following alterations of rank are ordered in the Forest Department :—

(1) With effect from the 28th October 1892, consequent on the return of Mr. C. H. Hobart-Hamden from privilege leave :

Mr. H. Calthrop, Deputy Conservator, 4th (officiating 3rd) grade, to revert to his substantive appointment.

Mr. W. T. T. McHarg, Assistant Conservator, 2nd grade (officiating Deputy Conservator, 4th grade), to officiate as Assistant Conservator, 1st grade.

(2) With effect from the 3rd November 1892, consequent on the departure of Mr. Herbert Carter on privilege leave :

Mr. W. T. T. McHarg, Assistant Conservator, 2nd (officiating 1st) grade, to officiate as Deputy Conservator, 4th grade.

(3) With effect from the 8th November 1892, consequent on the return of Mr. H. Slade from furlough :

Mr. J. C. Murray, Deputy Conservator, 3rd (officiating 2nd) grade, to revert to his substantive rank.

Mr. H. Jackson, Deputy Conservator 4th (officiating 3rd) grade, to revert to his substantive rank.

Mr. W. T. T. McHarg, Assistant Conservator, 2nd grade (officiating Deputy Conservator 4th grade), to officiate as Assistant Conservator, 1st grade.

15*th November* 1892.—No. 409.—Under the provisions of Article 291 and note to Article 282 (*a*) of the Civil Service Regulations privilege leave for three months and fifteen days is granted to Mr. H. Carter, Assistant Conservator or Forests, with effect from the 3rd November 1892.

15*th November* 1892.—No. 280 —At the departmental examination held at Rangoon on the 7th November 1892 the following officers passed in Burmese by the standards specified :

Higher Standard.

Mr. G. R. Long, Assistant Conservator of Forests.

Mr. J. Messer, Assistant Conservator of Forests.

Lower Standard.

Mr. E. B. Powell, Extra Assistant Conservator of Forests.

10*th November* 1892.—No. 3.—Mr. P. W. Healy, Extra Assistant Conservator of Forests, reported his return to duty on 5th November 1892 from the two months' examination leave granted in Revenue Department Notification No. 255 of the 31st August 1892.

10*th November* 1892.—No. 4.—Mr. T. A. Hauxwell, Deputy Conservator of Forests, made over, and Mr. P. W. Healy, Extra Assistant Conservator of Forests, received charge of, the Agency Division, on the afternoon of the 9th November 1892.

15*th November* 1892.—No. 25.—With reference to Revenue Department Notification No. 382 (Forests), dated the 3rd instant, Mr. H. B. Anthony, Deputy Conservator of Forests, made over, and Mr. G. Q. Corbett, Deputy Conservator of Forests, received charge of, the Toungoo division on the forenoon of the 12th instant.

15*th November* 1892.—No. 26 —With reference to Revenue Department Notification No. 409 (Forests), dated the 15th November 1892, Mr. H. Carter, officiating Deputy Conservator of Forests, made over, and Mr J. Messer, Assistant Conservator of Forests, received charge of, the Working Plans division on the afternoon of the 2nd instant.

17*th November* 1892.—No. 27.—With reference to Revenue Department Notification No. 382 (Forests,) dated the 3rd instant, Mr. W. F. L. Tottenham, officiating Deputy Conservator of Forests, made over, and Mr. H. B. Anthony, Deputy Conservator of Forests, received charge of, the Thayetmyo division on the afternoon of the 15th instant.

16*th November* 1892.—No. 10.—With reference to Revenue Department Notification No. 350, dated Rangoon, the 20th October 1892, Mr. H. N. Thompson, Assistant Conservator of Forests, made over, and Mr. T. H. Aplin, Deputy Conservator of Forests, received charge of, the Lower Chindwin division, on the forenoon of the 9th instant.

14*th November* 1892.—No. 406.—With reference to Rule 18 of the rules under the Burma Forest Act, 1881, and under the provision of

clause (*g*) of section 43 of the said Act, the Chief Commissioner adds the following station to the list of stations already notified to which timber in transit shall be taken by those in charge of it for examination or for the realization of any money payable to Government in respect thereof or in order that any mark may be affixed thereto:—

Tenasserim Forest Circle.

Division.	Revenue station	Civil district in which situated.
West Salween ...	Shwegun ...	Amherst.

No. 407.—In the exercise of the powers conferred by sections 37 and 43 (*g*) and (*h*) of the Burma Forest Act, 1881, the Chief Commissioner makes the following rules to regulate matters referred to therein in the Arakan Hill Tracts district.

1. For all timber, excluding that of the reserved kinds, and for firewood, shaw, and bamboos not bearing the Government sale-hammer or revenue-paid mark, or covered by a receipt for the revenue payable thereon, which may arrive at any revenue station in the Arakan Hills district, payment shall be made at the following rates:—

	Rate of duty. Rs. A. P.	
Thinganet	... 3 0 0	per tree.
Tharazaing	... 3 0 0	
Kyandwet	... 2 8 0	
Aukkyinza	... 2 8 0	
Panè	... 2 8 0	
Thitpôk	... 2 0 0	
Letpan	... 2 0 0	
Zaing	... 2 0 0	
Other unreserved trees ...	... 1 8 0	
Shaw	... 10 0 0	per 100.
Bamboos — ...	... 0 4 0	

2. The stations at which timber in transit in the Arakan Hill Tracts district shall be taken by those in charge of it for examination and for the realization of any money payble to Government in respect thereof, or in order that any mark may be affixed thereto, shall be the following:—

KALADAN LOWER LEMRU.

3. The Chief Commissioner appoints—

(i) the senior Police Officer Kaladan outpost;

(ii) the senior Police Officer, Lower Lemru police station;

to be the officers who shall manage and control the revenue stations referred to in Rule 2.

23rd November 1892.—No.—417 (Forests).—In exercise of the powers conferred by section 37 of the Burma Forest Act, 1881, and in supersession of Revenue Department Notifications No. 98, dated the 17th March 1892, and No. 326, dated the 14th October 1892, the Chief Commissioner prescribes the following form of license for the extraction of *kalamet and tôn-nwè* in the Mergui district of the Tenasserim division:—

No. VIIB.—Trade license for the extraction of Kalamet and Tôn-nwè in the Mergui district.

License to cut, saw, convert, remove, or otherwise utilize kalamet, tôn-nwè trees to the extant of viss is granted under Rule 8 of the Forest Rules to of in Forest, circle, Mergui district for months from date of this license under the following conditions :—

(1) That payment is made at the rate of Rs. 2, annas 6 per 100 viss for kalamet, tôn-nwè, or at such lower rates as may be fixed by the Conservator at such places and at such times as may be entered on the reverse.

(2) That only dead kalamet wood shall be cut, sawn, converted, removed or othewise utilized.

(3) That the license is not transferable and must be in the possession of the person to whom it was granted or of his agent, when such person or his agent is felling the timber covered by it.

(4) That the timber extracted on this license shall not be utilized before it has been paid for in full.

(5) That breach of any of the above conditions shall render the holder of the license liable to forfeiture of the license and confiscation of the timber, as well as to the punishment provided in the Forest rules.

9.—Assam Gazette.

27*th October*, 1892.—No. 9638 G.—The following is published :

The undermentioned officer has been granted by Her Majesty's Secretary of State for India permission to returned to duty, as advised in List dated the 19th August, 1892 :

Name.	Service.	Appointment.	Date on which permitted to return.
Mr. J. E. Barrett	...	Assistant Conservator of Forests.	Within period of leave.

APPENDIX SERIES

OF

THE INDIAN FORESTER.

[REPORT]

ON THE

SEA-BORNE TRADE IN THE TIMBERS OF BURMA.

BY

F. J. BRANTHWAITE,
DEPUTY CONSERVATOR OF FORESTS.
BURMA.

I.—HISTORY OF THE SEA-BORNE TRADE IN TEAK.

Figures are available from 1855-56, which show the tonnage and value of the Teak timber exported from Moulmein and Rangoon to various other ports. These ports may be arranged under three heads, *viz.*,—

(1) Internal ports, *i.e.*, the ports of Hindustan;
(2) Foreign or external ports;
(3) Provincial ports, including the Andamans.

Taking the first decade for which we have figures available, we find that the amount of timber exported and its value increased steadily for both ports.

From Rangoon to all ports in—

	Tons.	Value. R	
1855-56	2,342	1,40,609	were exported.
1864-65	26,251	14,56,887	

i.e., the amount increased eleven-fold in the ten years, the money value increasing about ten-fold.

From Moulmein to all ports in—

	Tons.	Value. R	
1855-56	28,777	14,38,956	were exported.
1864-65	114,368	68,37,942	

i.e., the amount of timber increased about four-fold during the ten years, whilst its value increased by rather more than 4½ times.

The total amount of timber exported from Rangoon during the ten years was 108,339 tons, valued at ₹61,66,244, *i.e.*, over ₹56 per ton. Though Moulmein exported over six times as much timber,

viz., 687,602 tons, valued at R3,72,89,411, the quality apparently was not quite so good, as the average value was only about R54 per ton. With reference to the timber shipped to external ports, of that exported from Rangoon about half, whilst of that exported from Moulmein nearly the whole was for the United Kingdom.

During these ten years the price of Teak in the round log varied from R12¾ to R32¼ per ton, taking as our criterion the prices realized by Government on the timber sold by it.

In the second decade and after, I have arranged the figures somewhat differently, as the amount exported to Provincial ports was comparatively small and has decreased steadily. These ports are, in the tables showing the export of Teak, included in the internal ports.

An examination of the table showing the exports from 1865-66 to 1874-75 shows—

(i) that the export trade in Teak from Rangoon to Foreign ports increased at an enormous rate—in fact the amount in tons more than quadrupled itself—whilst the money value of the timber increased more than five-fold. These figures, owing to two bad years, are considerably reduced for the total increase. The trade of Rangoon with Indian ports remained fairly stationary.

(ii) that the trade from Moulmein to both Foreign and Indian ports decreased, but showed signs of reviving during the last three years of the decade. For the ten years, whilst the trade of Rangoon more than doubled itself in amount and nearly trebled in money value, that of Moulmein only increased in tonnage about 8 per cent., and in value between 12 and 13 per cent, as compared with the totals for the same ports for the years 1855-56 to 1864-65.

During the ten years in question the market value of Teak in the log, as shown by the prices realized at the Government sales, varied from R20½ to R39¼ per ton as against R12½ to R32¼ per ton (for teak in the round log) in the previous ten years.

I can find no information as to the percentage sent to the United Kingdom during this period.

1875-76 to 1884-85.

The figures for these ten years show great variations, especially during the last two years, *viz.*, 1883-84-1884-85. In these two years the total export of Teak from Rangoon rose most wonderfully, whilst in Moulmein it decreased.

During the ten years the trade with Indian ports from Rangoon and Moulmein was almost double of that with foreign ports.

The total trade from Rangoon doubled itself in value; that of Moulmein increased by about three-fifths, but still the trade from Moulmein was more than double that from Rangoon.

1885-1891.

During this period the trade from Rangoon went on increasing, reaching last year (1890-91) 110,675 tons, while that of Moulmein decreased steadily. Last year (1890-91) it was only 64,227 tons. It was exceeded for the first time by Rangoon in 1889-90.

Table showing Total Teak exported fro n 1855-56 to 1864-65.

Year.	INTERNAL PORTS.				FOREIGN PORTS.				PROVINCIAL PORTS.			
	From Rangoon.		From Moulmein.		From Rangoon.		From Moulmein.		From Rangoon.		From Moulmein.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
		R		R		R		R		R		R
1855-56 .	2,315	1,38,934	5,956	2,97,857	22	1,351	21,157	10,57,872	5	324	1,664	83,227
1856-57 .	3,508	2,10,488	7,395	3,69,877	43	2,594	33,865	16,47,337	26	1,559	1,066	53,357
1857-58 .	964	57,854	27,051	10,12,155	186	11,214	40,604	18,62,233	34	2,074	1,716	74,862
1858-59 .	8,915	5,34,920	36,050	17,57,060	4,044	2,42,678	40,671	19,54,165	16	975	893	33,622
1859-60 .	4,883	2,93,021	22,125	12,05,762	2,723	1,63,394	37,365	19,45,853	...	...	728	37,903
1860-61 .	2,801	1,68,067	26,629	14,77,564	3,540	2,12,414	25,751	14,48,589	206	12,348	1,350	38,815
1861-62 .	1,978	1,09,658	38,493	22,91,701	10,328	5,77,319	57,944	37,00,493	272	15,670	1,533	70,702
1862-63 .	7,509	4,09,942	39,889	21,27,415	8,043	4,70,650	34,964	21,39,222	229	10,610	715	35,385
1863-64 .	4,795	2,48,925	39,987	21,50,304	14,567	8,04,911	26,493	15,02,290	136	7,463	1,180	75,847
1864-65 .	18,503	10,45,997	55,431	30,38,102	7,448	3,93,357	55,283	35,91,898	300	17,533	3,649	2,07,952
Total .	56,171	32,17,806	2,99,006	1,57,27,797	50,944	28,79,883	3,74,097	2,06,49,942	1,224	68,536	14,499	7,11,672

Teak exported.

Decade.	To Foreign Ports.				To Indian Ports.				Total.			
	From Rangoon.		From Moulmein.		From Rangoon.		From Moulmein.		From Rangoon.		From Moulmein.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
		R		R		R		R		R		R
1855-56 to 1864-65	50,944	28,79,842	3,74,097	2,08,49,942	57,395	32,86,362	3,13,505	1,64,39,469	1,08,339	61,66,244	6,87,602	3,72,89,411

Teak exported.

Year.	To Foreign Ports.				To Indian Ports.				Total.			
	From Rangoon.		From Moulmein.		From Rangoon.		From Moulmein.		From Rangoon.		From Moulmein.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
		R		R		R		R		R		R
1865-66 .	4,618	2,72,339	42,571	28,14,049	19,516	11,69,556	76,405	45,53,785	24,134	14,41,895	1,18,976	73,67,834
1866-67 .	2,695	1,59,710	15,088	10,09,028	16,528	9,33,539	33,101	20,75,288	19,223	10,93,299	48,189	30,84,316
1867-68 .	3,496	1,98,126	14,657	9,44,489	13,927	7,48,186	47,598	26,18,495	17,423	9,46,312	62,255	35,62,984
1868-69 .	4,710	3,01,264	35,519	22,61,002	12,199	7,30,126	62,814	36,70,716	16,909	10,31,390	98,333	59,31,718
1869-70 .	8,233	5,52,305	12,356	7,96,758	18,583	11,37,375	52,413	31,74,626	26,816	16,89,680	64,769	39,73,384
1870-71 .	9,534	6,14,652	23,299	15,94,295	16,931	9,36,589	30,605	16,73,163	26,465	15,51,241	53,904	32,67,458
1871-72 .	14,807	9,29,045	27,733	19,93,433	15,480	9,05,021	29,267	16,72,083	30,287	18,34,066	57,000	36,65,516
1872-73 .	15,944	10,63,955	35,955	26,19,350	20,400	11,70,218	42,702	23,73,979	36,344	22,34,173	78,657	49,93,329
1873-74 .	15,399	11,04,072	34,888	26,71,450	14,658	9,58,424	51,473	31,53,382	30,057	20,62,496	86,361	58,24,832
1874-75 .	18,524	14,60,708	23,650	17,87,818	20,642	15,20,413	52,989	33,33,770	39,166	29,81,121	76,639	51,21,588
Total .	97,960	66,56,226	2,65,716	1,84,93,672	1,68,864	1,02,09,447	4,79,367	2,82,99,287	2,66,824	1,68,65,673	7,45,083	4,67,92,959

Teak exported—continued.

Year.	To Foreign Ports.				To Indian Ports.				Total.			
	From Rangoon.		From Moulmein.		From Rangoon.		From Moulmein.		From Rangoon.		From Moulmein.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
		£		£		£		£		£		£
1875-76	25,311	17,88,699	34,270	25,29,115	32,459	23,91,561	70,899	46,02,224	57,770	41,80,260	1,05,169	71,31,339
1876-77	18,773	13,98,052	26,102	19,12,679	20,374	14,58,443	52,421	32,79,671	39,147	28,56,495	78,523	51,92,350
1877-78	17,904	12,82,942	38,383	27,07,654	20,030	14,13,203	84,859	51,51,452	37,934	26,96,145	1,23,242	78,59,106
1878-79	14,247	10,26,663	21,376	15,56,015	16,365	11,61,349	81,831	45,76,460	30,612	21,88,012	1,03,207	61,32,475
1879-80	6,561	4,74,683	32,049	23,09,594	17,185	11,13,316	65,366	37,25,750	23,746	15,87,999	97,415	60,34,344
1880-81	17,933	12,86,987	46,563	36,13,995	19,942	13,81,374	66,835	39,15,955	37,875	26,68,361	1,13,398	75,29,950
	...	...	...	*61,550*	...	...	...	*3,60,231*	...	...	...	*4,21,781*
1881-82	8,913	7,53,021	46,538	42,48,491	13,532	11,61,210	64,768	42,26,753	22,445	19,14,231	1,11,306	84,75,244
	...	*4,109*	...	*16,067*	...	*5,879*	...	*1,36,070*	...	*9,981*	...	*1,52,137*
1882-83	15,031	14,89,690	43,115	45,34,209	24,472	24,19,566	68,533	56,03,145	39,503	39,09,256	1,11,648	1,01,37,354
	...	...	..	*48,868*	...	*4,144*	...	*1,04,453*	...	*4,144*	...	*1,53,321*
1883-84	20,942	21,80,774	23,375	28,47,298	47,107	47,25,456	66,984	61,42,743	68,049	69,06,230	90,359	89,90,041
	...	...	...	*37,673*	...	*1,35,306*	...	*72,028*	...	*1,35,306*	...	*1,09,601*
1884-85	17,289	18,30,143	27,496	32,33,987	34,839	30,09,521	68,352	53,45,130	52,128	48,39,664	95,848	85,79,117
	...	*700*	...	*81,712*	...	*1,357*	...	*48,159*	...	*2,057*	...	*1,29,864*
Total	1,62,904	1,35,11,654	3,39,267	2,94,92,037	2,46,305	2,02,34,999	6,90,848	4,65,69,283	4,09,209	3,37,46,653	10,30,115	7,60,61,320
	...	*4,809*	...	*2,46,810*	...	*1,46,679*	...	*7,90,984*	...	*1,51,488*	...	*9,67,244*
Grand Total.	...	1,35,16,463	...	2,97,38,847	...	2,03,81,678	...	4,72,90,217	...	3,38,98,141	...	7,70,28,564

Figures italicised denote value of converted timber.

Teak exported—continued.

Year.	TO FOREIGN PORTS.				TO INDIAN PORTS.				TOTAL.			
	From Rangoon.		From Moulmein.		From Rangoon.		From Moulmein.		From Rangoon.		From Moulmein.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
		R		R		R		R		R		R
1885-86 .	21,943	23,73,517 *2,070*	24,435	28,04,328 *41,710*	41,425	29,98,813 *256*	80,805	55,04,832 *57,971*	63,368	53,72,330 *2,326*	1,05,240	83,09,160 *99,681*
1886-87 .	10,942	9,61,512 *7,599*	11,244	11,26,410 *39,890*	35,792	25,05,049 *26,636*	85,356	51,08,561 *74,937*	46,734	34,66,561 *33,234*	96,600	62,34,971 *1,14,827*
1887-88 .	F. 14,968	12,04,983	21,209	20,92,350 *45,048*	37,449	24,94,627 *41,401*	95,298	58,62,462 *211,499*	52,417	36,99,610 *41,401*	1,16,507	79,54,812 *256,547*
1888-89 .	F. 17,870	19,61,030 *5,437*	31,875	35,78,044 *73,083*	45,099	29,48,517 *16,064*	61,590	41,43,775 *125,813*	62,969	48,99,547 *21,501*	93,465	77,21,819 *198,895*
1889-90 .	39,180	39,74,371	28,694	33,43,958 *73,953*	64,380	42,10,472 *8,680*	52,177	36,61,899 *192,747*	1,03,560	81,84,843 *3,680*	80,871	70,05,857 *903,700*
1890-91 .	25,910	25,66,474	11,503	11,55,140	84,765	52,96,510 *12,780*	52,724	35,46,294 *1,842*	1,10,675	78,63,014 *12,780*	64,227	47,01,434 *1,842*
Total .	1,30,813	130,31,887 *15,106*	1,28,960	1,41,00,230 *2,73,684*	3,08,910	204,54,018 *99,816*	4,27,950	278,27,823 *6,01,808*	4,39,723	334,85,905 *1,14,922*	5,56,910	419,28,053 *8,75,492*

Figures italicised denote value of converted timber.

Average selling rates of teak in the home market per load.

Month.	1880-81.		1881-82.		1882-83.	1883-84.	1884-85.	1885-86.	1886-87.	1887-88.	1888-89.	1889-90.	1890-91.
	Churchill and Sim's.	Clyde.	Churchill and Sim's.	Clyde.	Churchill and Sim's.								
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d	£ s. d.
April	15 0 0	13 10 0	14 0 0	13 3 4	14 0 0	16 0 0	16 5 0	13 15 0	14 5 0	11 10 0	10 10 0	13 0 0	13 0 0
May	15 0 0	14 7 6	14 0 0	13 13 10	14 0 0	16 0 0	16 5 0	14 5 0	13 0 0	10 10 0	10 10 0	13 0 0	13 0 0
June	15 0 0	14 0 0	14 0 0	13 2 4	14 0 0	16 0 0	15 0 0	14 5 0	13 0 0	10 10 0	10 10 0	13 0 0	13 0 0
July	14 10 0	13 15 0	14 0 0	13 10 6	14 0 0	16 0 0	13 15 0	14 5 0	13 0 0	10 10 0	10 10 0	13 0 0	13 0 0
August	14 10 0	13 5 6	14 0 0	14 1 0	14 15 0	16 0 0	13 15 0	14 5 0	12 0 0	10 10 0	10 10 0	13 15 0	11 5 0
September	14 10 0	13 5 6	14 0 0	13 15 0	14 15 0	16 0 0	13 15 0	14 5 0	12 0 0	10 10 0	11 10 0	13 15 0	11 5 0
October	14 10 0	13 0 0	14 0 0	13 0 0	14 15 0	16 5 0	13 15 0	14 5 0	12 0 0	10 10 0	11 10 0	13 15 0	11 5 0
November	14 10 0	12 17 0	14 0 0	13 8 10	14 15 0	16 5 0	13 15 0	14 5 0	12 0 0	10 10 0	11 10 0	13 15 0	11 5 0
December	14 10 0	12 15 0	14 0 0	13 0 0	14 15 0	16 5 0	13 15 0	14 5 0	12 0 0	10 10 0	11 10 0	13 15 0	11 5 0
January	...	15 0 0	14 0 0	13 3 2	14 15 0	16 5 0	13 15 0	14 5 0	11 10 0	10 10 0	11 10 0	13 0 0	11 5 0
February	14 10 0	13 2 6	14 0 0	13 18 4	15 5 0	16 5 0	13 15 0	14 5 0	11 10 0	10 10 0	11 10 0	13 0 0	11 5 0
March	14 10 0	13 5 0	14 0 0	13 12 6	15 5 0	16 5 0	13 15 0	14 5 0	11 10 0	10 10 0	11 10 0	13 0 0	11 5 0
Average price per load	14 12 10	13 10 3	14 0 0	13 9 1	14 11 8	16 2 6	14 5 5	14 4 2	12 6 3	10 11 8	11 1 8	13 6 3	11 16 8

Average Rangoon rates for 1st and 2nd class timber in the round obtained at the sales at the Government Depôt.

	1880-81.		1881-82.		1882-83.		1883-84.		1884-85.	1885-86.	1886-87.	1887-88.	1888-89.	1889-90.	1890-91.
	1st class.	2nd class.	1st class.	2nd class.	1st class.	2nd class.	1st class.	2nd class.	1st and 2nd classes.	1st and 2nd classes.	1st and 2nd classes.	1st and 2nd classes.	1st and 2nd classes.	1st and 2nd classes.	1st and 2nd classes.
	R a. p.	R a. p.	R a. p.	R a. p.	R a. p.	R a. p.	R a. p.	R a. p.	R a. p.	R a. p.	R a. p.	R a. p.	R a. p.	R a. p.	R a. p.
April . . .	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*	46 1 10	25 9 5	36 6 9	35 2 1	43 8 11	54 0 6	39 11 7
May . . .	45 5 0	27 3 4	64 15 4	47 13 10	57 1 8	40 3 11	66 7 9	40 5 7	31 5 10	35 1 2	37 9 2	35 0 11	45 15 5	49 9 7	32 9 1
June . . .	43 1 4	26 9 2	59 6 9	40 11 5	65 9 10	47 10 5	74 1 4	46 4 0	47 2 8	42 2 10	36 2 9	35 0 0	45 5 11	51 7 6	30 6 0
July . . .	36 0 0	26 6 6	53 10 3	36 15 6	52 14 2	32 8 11	*Nil*	57 6 0	37 11 11	50 2 11	35 4 0	38 11 5	49 10 3	50 13 6	2 13 7
August . .	*Nil*	25 4 8	65 14 4	35 11 8	73 2 3	53 9 10	*Nil*	67 11 5	34 3 11	35 2 2	39 1 3	35 3 8	43 13 7	51 4 2	28 14 8
September . .	47 7 4	30 13 3	70 2 5	42 13 7	74 6 5	50 0 11	*Nil*	52 6 1	34 2 7	40 10 2	42 11 9	39 0 11	47 12 9	53 12 1	36 10 11
October . .	44 6 5	42 1 6	*Nil*	*Nil*	65 7 7	51 3 11	102 12 0	60 9 0	26 8 8	37 4 11	46 5 8	38 7 6	45 6 6	49 14 1	34 15 7
November . .	47 2 10	33 10 10	*Nil*	*Nil*	56 1 2	44 10 0	88 8 7	60 10 0	30 14 8	36 12 9	43 1 6	37 15 2	*Nil*	42 6 9	35 9 9
December . .	49 4 0	35 7 7	72 8 10	38 8 6	*Nil*	*Nil*	79 7 7	61 15 0	38 9 8	31 2 11	39 12 6	39 12 10	61 6 10	51 11 11	37 10 8
January . .	*Nil*	*Nil*	80 4 2	51 8 6	63 4 0	52 11 1	*Nil*	*Nil*	29 7 2	36 8 1	31 9 6	38 7 4	*Nil*	45 6 11	42 10 1
February . .	55 12 8	38 9 7	69 0 4	41 3 6	69 6 3	55 0 10	59 13 5	*Nil*	33 4 0	33 13 6	27 12 0	47 5 2	54 2 10	52 5 6	42 10 1
March . .	53 1 3	41 3 9	60 1 8	42 6 11	76 4 9	46 15 9	53 3 2	*Nil*	29 1 7	41 0 5	37 11 0	43 8 0	50 14 0	36 1 3	42 11 8

Supplementary Table showing the Exports of Teak to the United Kingdom during the last 16 years.

Year.	Value. ₹	Tons.
1875-76	39,57,279	54,194
1876-77	28,75,061	38,433
1877-78	35,36,412	49,310
1878-79	21,21,702	29,447
1879-80	19,98,230	25,511
1880-81	45,19,803	58,683
1881-82	44,52,075	48,959
1882-83	51,78,211	50,221
1883-84	30,74,007	27,023
1884-85	39,01,749	33,319
Total ...	356,14,529	415,200
1885-86	41,83,350	36,573
1886-87	17,22,341	17,441
1887-88	19,00,036	19,596
1888-89	43,13,121	38,785
1889-90	64,71,769	60,112
1890-91	31,51,115	30,915
Total ...	217,41,732	203,422

II.—HISTORY OF EXPORT TRADE OF TIMBER OTHER THAN TEAK.

As in the case of Teak, I am only dealing with the ports of Rangoon and Moulmein, though small quantities are exported from Mergui, Tavoy, and Akyab.

Many attempts have been made to introduce woods other than Teak into the market, *e.g.*, in 1872-73.

Thinwin (*Pongamia glabra*), which resembles the rose-wood of Southern India, was sent for trial to the cabinet-makers of Calcutta and Madras and to England. It was not favourably reported on, the hardness of the grain rendering it very difficult to work. A piece was also tested by a local firm for machinery bearings, but was found unsuitable.

Thitka (*Pentace burmanica*) and Thitkado (*Cedrela Toona*) were sent to England; but no hope of a large and steady demand for these woods was held out, as they could not compete in price with the bastard mahogany and cedar wood from South America. The sale of small quantities in Calcutta was however attended with some success, ₹65 to ₹68 per ton being realized.

Sample shipments of Padauk, Thingan, and Anan were also made.

1873-74.

1,330 tons of Thitka were exported from Moulmein, 1,105 tons going to England. From the same port were exported 50 tons of Padauk to Madras, 88 tons of Pyinma to Calcutta, and 50 tons of Thingan to Dacca. From Akyab 82 tons of Pyinkado (*Xylia dolabriformis*) were exported to India.

1874-75.

618 tons of Thitka and Thitkado and 576 tons of Padauk, Ingyin, Pyinkado, etc., were exported from Moulmein to India.

1875-76.

146 tons of Padauk were sold by the department to the Madras Gun Carriage Factory at a net profit of ₹49-8 per ton.

The exports of wood other than Teak from 1875-76 are shown in the tables on page 12.

Exports of Timber other than Teak (unconverted).

Year.	To Foreign Ports.				To Indian Ports.				Total			
	From Rangoon.		From Moulmein.		From Rangoon.		From Moulmein.		From Rangoon.		From Moulmein.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
		R		R		R		R		R		R
1875-76	5	...	551	27,645	...	...	204	6,261	5	...	755	33,906
1876-77	...	...	17	605	461	26,390	1,229	40,224	461	26,390	1,246	40,829
1877-78	...	...	25	1,122	380	25,110	613	29,736	380	25,110	638	30,858
1878-79	35	1,635	31	1,115	37	1,882	558	21,335	72	3,517	589	22,450
1879-80	2	34	182	7,515	29	449	594	21,332	31	483	776	28,847
1880-81	...	...	11	307	187	7,120	1,083	52,573	187	7,120	1,094	52,880
1881-82	...	...	3	140	39	797	3,505	1,57,934	39	797	3,508	1,58,074
1882-83	...	...	11	600	31	1,897	4,614	2,25,187	31	1,897	4,625	2,26,687
1883-84	20½	1,631	6	280	108	6,890	5,958	2,81,823	128½	8,021	5,964	2,82,103
1884-85	1	60	36	1,453	190	10,482	3,529	1,67,567	191	10,542	3,565	1,69,020
Total	63½	3,360	873	40,782	1,463	80,517	21,887	10,03,972	1,525	83,887	22,760	10,44,754
1885-86	10	650	..	...	236	10,611	2,707	1,40,217	246	11,261	2,707	1,40,217
1886-87	5	484	6	130	367	15,147	1,306	66,896	372	15,631	1,312	67,0 0
1887-88	...	...	...	...	358	19,398	1,056	47,613	358	19,398	1,056	46,613
1888-89	1	96	1½	57	181	9,082	2,650	1,07,072	182	9,178	2,651½	1,07,129
1889-90	38	3,566	56	2,717	491	27,092	6,081	2,60,733	529	30,658	6,137	2,63,450
1890-91	3	231	137	5,396	95	3,836	4,194	1,40,722	98	4,067	4,331	1,46,118
Total	57	5,027	200½	8,300	1,728	85,166	17,994	7,62,253	1,785	90,193	18,194	7,70,553

Table shewing Total Export of Timber other than Teak.

Year.	To Foreign Ports.		To Indian Ports.		Total.	
	Rangoon.	Moulmein.	Rangoon.	Moulmein.	Rangoon.	Moulmein.
	Value in	Value in	Value in	Value in	Value in	Value in
	R	R	R	R	R	R
1880-81 .	P	220	P	74,088	8,225	74,308
1881-82 .	...	6,943	1,264	2,81,925	1,264	2,88,868
1882-83 .	...	600	49,447	2,53,355	49,447	2,53,955
1883-84 .	1,631	280	140,448	3,15,376	1,42,079	3,15,656
1884-85 .	260	2,215	2,96,073	1,88,684	2,96,333	1,90,899
1885-86 .	650	4,931	3,55,670	1,90,957	3,56,320	1,95,888
1886-87 .	23,479	130	3,10,458	1,43,249	3,33,937	1,43,379
1887-88 .	44,657	...	2,22,241	68,954	2,66,898	68,954
1888-89 .	42,591	66,936	1,54,971	2,17,949	1,97,562	2,84,885
1889-90 .	30,602	2,717	2,84,218	2,93,276	3,14,820	2,95,993
1890-91 .	7,961	50,950	2,31,951	3,00,603	2,39,912	3,51,553
Total .	1,51,831	1,35,922	20,46,741	23,28,416	22,06,797	24,64,338

For the last few years small quantities have been exported from the ports of Morgui and Tavoy.

III.—PRESENT STATE OF TEAK TRADE.

The trade in Teak is at present flourishing, and fairly high prices are being realized. At the last auction sale (30th January, 1892) of logs in the round held at the Government Timber Depôt at Rangoon the prices obtained were as follows :—

	Length.	Middle girth.	Rate.
			R a. p.
Yard-pieces .	45′ and above .	4′ 6″ and above .	123 0 0
Doogyis . .	25′ to 44′ . .	4′ 6″ and above .	72 8 0
Luzars . .	18′ to 24′ . .	4′ 6″ and above .	70 0 0
Yatthits . .	18′ and above .	Under 4′ 6″ . .	31 0 0
Rejected split, hollow, crooked or burnt, etc.	.....	.....	30 0 0

These prices are fairly high. At this sale the competition was good, not only among the big timber merchants, but also amongst the smaller ones.

One firm has two large sailing vessels waiting in the river to be loaded for England, where the market is now firm, it having recovered from the shock which it received owing to several consignments of very inferior Teak from Bangkok being sent.

For the present the prices are likely to remain fairly high, as, in consequence of the bad rains last year, the usual amount of timber from Upper Burma could not come down. This means that later on the Bombay-Burma Trading Corporation, Limited will probably have to buy.

There is a very fair trade, I am told, now being done in Mango wood, which is being used for dunnage and also for ventilators on the rice ships.

In conclusion I might compare the rate of freights now and twenty years ago.

Twenty years ago £4-10-0 to £5 per ton and insurance £7-7-0 per cent. was charged, and the time then taken to go to England and elsewhere was very long, as the ships used were, as a rule, rotten old tubs. Now it is about 45*s.* freight per ton, with insurance 4 per cent. on sailing vessels and only about ½ per cent. on steamboats.

IV.—POSSIBLE DEVELOPMENT OF TIMBER TRADE.

There is a large future before Burma in the timber market in species of wood which at present are little known, and still larger when the present stock in the American forests is exhausted, which it is rapidly becoming. In this country there are innumerable good woods which are seldom used, except in small quantities for domestic purposes by the Burmans themselves. These must in time prove of value, when the timber which is easily got at is exhausted, and when the means of carriage become more easy. Owing to the building of railways and making of roads this great desideratum is yearly advancing.

Among such species I may mention—

(i) *The Pyinkado* (*Xylia dolabriformis*).—This wood, the Iron wood of Burma, is already coming into use. It is a very heavy, dark-colored wood, weighing about 65 lbs per cubic foot. In Southern India it is largely used for railway sleepers, etc., owing to its great durability. Quite recently it has been used in Burma for the same purpose. A few weeks ago, in fact, the writer was told by the Superintending Engineer for Way and Works of the Burma State Railway that as long as Pyinkado could be got fairly cheap no other timber was wanted for sleepers, though, owing to its hardness, very large numbers of augers are yearly broken. In the Pegu Circle this tree is very plentiful and of large dimensions. In Aracan,

according to Dr. Schlich's report (1860), a third of the forest vegetation consists of this species; and, according to Mr. Nisbet's report (1883), Pyinkado is the tree most plentiful in that province. Of this timber Mr. Laslett in his work entitled "Timber and Timber Trees" says: "The samples I met with all looked remarkably well, and seemed fit to be employed in any work of construction where great strength is required." The great drawback against it is its weight, which makes it very difficult and expensive to put it on the market.

Padauk (*Pterocarpus indicus*).—Another Burmese wood, which would I fancy come into favour, were it only more pushed, though at present it is becoming known, is Padauk. This again is a heavy close-grained reddish wood, but is not so hard and is therefore much more easily worked than the Pyinkado. Its weight is about 60lbs per cubic foot.

It is prized above all other woods for cart wheels, and is also extensively used for gun-carriages. Brandis says that trees of the largest size abound to the east of the Sittang.

That it is becoming better known in England is shown by (i) C. Leary & Co.'s monthly circular (5th November, 1891), which says there is a steady demand at from R3 to R3-9 per cubic foot; (ii) In the weekly paper "Timber" for December, 1891, the following remarks occur: "Padauk wood is coming into favour in the north of England." "The effect produced by the use of polished Padauk for windows, doors and casings is unique." "After a careful inspection of this beautiful mahogany (*sic*) of Burma, it is difficult even for a connoisseur in fancy woods to forget that he is not looking at the richest and most perfect example of Spanish wood."*

This wood came from the Andamans.

Didôk (*Bombax insigne*).—This is a light-colored wood, weighing about 30lbs per cubic foot. The wood, though much more lasting than that of *B. malabaricum*, is not durable, but, owing to its extreme lightness of weight, it should prove very useful for packing cases of a temporary nature. At the present time it is being extensively used in Burma for packing prepared cutch for shipment to England, and would form a very good and light wood for tea boxes, etc. For such purposes it is well worth a more extensive trial, as much would be saved in freight on large shipments; moreover very large and broad boards could be obtained. As it is so light, it is easy to get it to market, and, as it is soft, the working and sawing charges should not be heavy. It has been shipped from the Andamans in the shape of tea boxes.

In or Eng (*Dipterocarpus tuberculatus*).—The timber of this tree is a hard red-colored wood, weighing about 52lbs. the cubic foot.

* A detailed account of Padauk wood has been published as an appendix to the "Indian Forester," July, 1892.

It is largely used in Burma for house-building, and lasts about six years in boards exposed to the rains, but is a favourite food of the white ants.

This wood has been used extensively by Cutch merchants for packing Cutch for shipment to England. The Bombay-Burma Trading Corporation, Limited, who do a large trade in Cutch, use this wood almost entirely, and have established a saw-mill up country at which little else than the making of Eng Cutch boxes is done. Owing to the weight of the wood and the amount of oil contained in it, it is not suited for making tea boxes; but whether it has been used for this purpose I cannot say.

Is also used for making ventilators, for which purpose I am told it is an excellent wood.

Thitya (*Shorea obtusa*); *Inggyin* (*Shorea Siamensis*).—These trees are both closely allied to the Sâl tree of India, the timber of which is so well known.

The timber of the Thitya is more even-grained than that of the Sâl; it weighs almost 60 lbs per cubic foot. The Inggyin weighs about 54 lbs. Both woods are much prized on account of their durability.

Thitkado (*Cedrela Toona*).—The Toon tree. The wood of this tree is durable and not eaten by white ants. Its average weight is about 37 lbs the cubic foot. It is used for furniture, and has been exported from Burma for making cigar boxes. If not well seasoned it shrinks, which is a great drawback against its use for furniture-making.

Thitka (*Pentace burmanica*).—An even-grained reddish wood, weighing about 42 lbs the cubic foot; used for tea and cigar boxes.

The two last species have not been able to hold their own against the Cedar and Bastard Mahogany imported from South America, owing to the high price of freight from the Burmese ports.—*Vide* Forest Administration Report for British Burma, 1873-74.

Pyinma (*Lagerstræmia Flos Reginæ*).—A very valuable light red hard wood, weighing about 42 lbs. the cubic foot, which would be very useful for boat-fitting, etc., and is used for ordnance purposes. It is a splendid wood for sleepers and all purposes where the timber is exposed to the damp. It is plentiful throughout British Burma.

Amongst other woods which may turn out to be very useful as the demand arises are—

Gungaw (*Mesua ferrea*).—A very hard strong imperishable wood, very difficult to work. Not plentiful.

Gyo. (*Schleichera trijuga*).—Hard, close-grained, and lasting. Fairly common throughout Burma.

Pinlè kanazo. (*Heritiera littoralis*).—Hard, close-grained and very strong, but difficult to work and seasons slowly. Makes very good gun-stocks. Grows near the sea.

Magyi (*Tamarindus indica*).—Heart wood very hard, but almost imperishable. Cultivated all over Burma, so small quantities could be available.

Kyithé (*Glula tavoyana*).—A dark red handsome wood which takes an excellent polish and seasons and works well. Common in the Andamans.

Thingan (*Hopea odorata*).—A yellowish hard wood. Is heavy and lasts very well.

Karamé (*Cinnamomum ?*).—A very good moderately hard wood. Found in Tenasserim, but not in large quantities. A small trade is done in it for house, building. It takes a beautiful polish for furniture. According to Gamble it is also used for shingles.

Anan (*Fagræa fragrans*).—An invaluable wood for sub-marine works, as it is not attacked by the mollusc Teredo. Found in Tenasserim.

Kuzan (*Hymenodictyon excelsum*).—A very light close-grained wood weighing about 33lbs per cubic foot. It is easily worked and straight grained. Would make an excellent wood for packing cases. For this purpose it is, I should say, a better wood than Didôk, but the tree is neither so large nor so plentiful as the latter.

Kanyin (*Dipterocarpus turbinatus, D. alatus, D. lævis*).—A reddish brown wood weighing about 48lbs per cubic foot. The wood does not last more than a year or two when exposed in a damp climate. Is largely used in Burma for canoes and planking. The trees are plentiful and of a large size. Large quantities are now being exported for tea chests and ventilators of rice cargoes.

An attempt has, I hear, been made lately to supply sleepers of this wood in large quantities to Indian railways. For this purpose, owing to its rapid decay when exposed, it is unsuitable.

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